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ABSTRACT

The objectives of this study were: (1) to identify the middle and upper-middle class urban audience in terms of certain selected variables; (2) to design and perfect techniques to measure attitude toward and knowledge of pesticides and chemicals; (3) to determine the present knowledge and attitude of the audience toward pesticides and chemicals; (4) to determine the effectiveness of a planned Extension communications program in bringing about a change in attitude; and (5) to ascertain the relative effectiveness of various Extension communication methods in searching and influencing the selected audience. To accomplish these objectives, the research plan was designed to: (1) collect data from a random sample of individuals within the test population in order to obtain an audience profile and to identify benchmarks of knowledge and attitude; (2) expose a selected test area to a planned experimental communications program; (3) collect data from a second random sample within the test population so that post-treatment profiles and benchmarks could be established; and (4) evaluate the effectiveness of the experimental treatment and of the separate communication media used in changing levels of knowledge and attitudes. Results, conclusions, and recommendations are given. (Author/DB)

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# The Effect of a Planned Communication Program On Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides

*by*
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This study was conducted by the Virginia Cooperative Extension Service, Virginia Polytechnic Institute, cooperating with the Federal Extension Service of the United States Department of Agriculture.

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## INTRODUCTION

A number of events in the past decade have demonstrated that many people in our Country do not realize the extent to which pesticides contribute to our health, happiness and present-day high standard of living. Many individuals who do recognize pesticides as essential in modern-day living, unfortunately, are not thoroughly knowledgeable in the safe and proper use of these materials.

Another segment of our population believes that pesticides are an evil outgrowth of modern technology and pose a threat to life on this earth. This unfavorable attitude can be traced in a large measure to misinformation, isolated but much-publicized accidents involving pesticides and/or a lack of correct information.

The need for pesticide education was recognized as early as 1960 by the Federal Extension Service. The FES asked state Cooperative Extension Service directors to designate a staff member as the contact man to receive the vast amount of complex information on pesticides emanating from government and private agencies. This information was to be evaluated, summarized, and passed along to individuals in the state who had need for it. Although this was a step in the right direction, it was realized almost immediately that more emphasis needed to be given to a pesticide education program.

Concern over the use of pesticides continued to mount until 1962 when it was brought into sharp national focus as a result of the dire predictions contained in Rachel Carson's best-seller, Silent Spring (6)[1]. The urgency of the pesticide problem became so great that Congress, in 1964, made an appropriation of $2,100,000 to the state Cooperative Extension Services for expansion of the educational program on the safe and proper use of pesticides. The Chemical, Drug and Pesticide Unit at Virginia Polytechnic Institute was created later that same year with Dr. W. R. VanDresser as Coordinator.[2]

## NEED FOR SPECIAL STUDY

The urgency and magnitude of the proposed pesticide education program prompted an evaluation of the audiences to be reached and the methods to be used. It was recognized at the outset that Extension has had a traditionally rural audience. Communication methods used in reaching this audience have been established and proven to be generally effective. It also was recognized, however, that an urban audience had to be considered in the pesticide education program.

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[1] Refers to literature cited.

[2] Dr. VanDresser has since been named Associate Dean and Dr. N. E. Lau has been named Coordinator of the Unit.

While work with the urban audience would be only part of the overall program, it was felt that it might well be one of the most important. Mrs. Esther Peterson, former Special Assistant to the President on Consumer Affairs, indicated that it is the middle and upper-middle class income groups who demand and support legislation concerning chemicals, drugs, and pesticides and the consumer. If pesticides were banned because of an inadequately informed public, our nation's economy, as well as its health, could be in jeopardy in a very short time. These observations pointed out the need for carrying to the urban audience an educational program on pesticides and their safe and proper use.

Faced with the responsibility of developing and conducting an urban educational program on pesticides, their use and regulation, it became necessary to learn whether a planned Extension communications program would be effective in bringing about desired changes in this urban audience. Likewise, guideposts needed to be established to aid in designing future programs.

Provisions were made in the original appropriation for additional funds which were to be used by states requesting funding for special studies related to the education program. In September, 1965, a grant of $38,800 from chemical pesticide funds was made to VPI to conduct a study on the effect of a planned communication program on change of attitude and knowledge of the urban dweller relative to chemicals and pesticides. The grant was assigned Budget Bureau No. 40-6673.

A number of studies (8, 10, 12, 15) have been made of urban dwellers and suburbanites. None of these, however, were oriented toward factors which were believed to have a direct bearing on an Extension educational program on chemicals and pesticides. Several studies have been made of knowledge and attitudes of farmers regarding pesticides (3, 4, 16, 18). One study (9) involved pesticide dealers, but none were found that were aimed directly at the middle and upper-middle class urban dweller. Graham (13) made a study of women in selected urban areas. Comparisons were made between use and non-use of pesticides based on educational attainment and other selected variables. The report is presented as Appendix B and is summarized in the results section of this report.

Raudabaugh (17) recognized the value of teaching people at their present stage of educational development. The need was stressed for Extension educators to recognized individual levels of knowledge, attitudes, interests, and understanding. Sabrosky (19) stated that educational stages or levels must be determined before any teaching takes place. These levels or benchmarks of knowledge and attitudes regarding pesticides were not known for our urban audience at the time that the first planned communications program was developed. The general subject of knowledge and attitude as they relate to this study has been discussed in a sub-study by Bush (5). The report is reproduced as Appendix C.

The effectiveness of a planned educational program may be determined by the change in attitude and knowledge that it produces. Prior to this study, techniques available for measuring change in attitude and knowledge had not been applied to the middle class urban audience in the field of chemicals and pesticides. Existing techniques were modified to fit this specific situation. Although designing and perfecting these techniques would provide tools needed in evaluating the effectiveness of the chemicals and pesticide education experimental program, it was felt that they also would be useful in designing and evaluating other Extension educational programs for urban audience.

## OBJECTIVES

The objectives of the present study may be summarized as follows:

1) To identify the middle and upper-middle class urban audience in terms of certain selected variables.
2) To design and perfect techniques to measure attitude toward and knowledge of pesticides and chemicals.
3) To determine the present knowledge and attitude of the audience toward pesticides and chemicals.
4) To determine, by using these techniques, the effectiveness of a planned Extension communications program in bringing about a change in attitude toward and knowledge of pesticides and chemicals on the part of the selected audience.
5) To ascertain the relative effectiveness of various Extension communication methods in reaching and influencing the selected audience.

### Research Plan

In the light of our objective, the research plan may be summarized in the following 4 statements:

1) To collect data from a random sample of individuals within the test population so that an audience profile could be drawn and benchmarks of knowledge and attitude could be identified. These data provided pre-treatment observations.
2) To expose a selected test area to a planned experimental communications program.
3) To collect data from a second random sample within the test population so that post-treatment profiles and benchmarks could be established.
4) To evaluate the effectiveness of the experimental treatment and of the separate communication media used in changing levels of knowledge and attitudes.

## METHODS

Several methods of data collecting were considered. It was decided that the most satisfactory data for a study of this nature would be obtained through use of a questionnaire which would be completed during face-to-face interviews. There are so many facets in the broad field of education in pesticides and chemicals, however, that it became necessary to limit the scope of the questionnaire. It was felt that the objectives of the research study could be best served by focusing attention on the following items:

a) The attitude of middle and upper-middle income urban dwellers toward the role of pesticides.
b) The audience's knowledge of buying, using, and storing pesticides correctly.
c) The audience's knowledge of and attitude toward government regulations and legislation concerning pesticides.
d) Audience's contact with and reaction to Extension's pesticide chemical educational program.
e) Profile data which might also relate to the above.

A questionnaire, or interview schedule, was developed by members of the VPI Extension staff with the help of Mrs. Laurel Sabrosky, Evaluation Consultant.[3] The designers agreed on what basic information would be desirable for the audience to have regarding pesticides and their control. Knowledge questions were then developed to determine how closely the test population approached this goal. Attitude questions were developed on the premise that pesticides are necessary and the safe use of them must continue. Likewise, it was assumed that it is desirable for the government to exert a degree of control over pesticides and their use. The original questionnaire was thoroughly pretested and appropriate revisions were made before the final document was submitted to the Bureau of the Budget for approval. A copy is reproduced in Appendix A.

Although the full interview schedule covered 70 questions, only the first 51 were used in the pre-treatment interviews. These questions were designed to supply benchmark data on knowledge and attitude as well as on profile characteristics. Questions 52 through 70 were related to the experimental treatment, so of course would have been meaningless in pre-treatment interviews.

## Coding and Scoring

Codes were established for responses to each question in the interview schedule. The codes were designed so that the results could be punched on IBM cards for future analysis in terms of frequency of occurence under selected categories.

Numerical scores were assigned to responses to questions that had been designed to determine the level of general pesticide knowledge and knowledge concerning government regulations of pesticides and their use. The scores were weighted to reflect the relative importance of each individual item, as determined by the designers of the questionnaire in consultation with other specialists in the field of chemical pesticides. The scores remained consistent through the experiment, but because of their somewhat arbitrary nature, should not necessarily be projected per se into a totally different evaluation experiment.

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[3] Formerly Extension Research Specialist, Evaluation, Research and Training, Federal Extension Service, USDA

The 10 questions designed to measure general knowledge were assigned values of 0, 2, 4, 5, or 9. If all questions were answered correctly, the respondent earned a total score of 53, or an average of 5.3 for the category. Knowledge of government regulations and activities concerning pesticides also was determined by 10 questions. Correct answers were valued at 5, 10, or 15 depending on the importance of the questions. Incorrect answers received no credit. A perfect total was 75 with an average of 7.5.

Certain statements in the interview schedule were designed to provide data to be used in measuring the attitude of the middle and upper-middle class urban dweller toward pesticides, their use, their harmful or beneficial effects, and toward government regulations. Likert's International Scale (11) was used in assigning the numerical values to each response. The 6 possible responses were: strongly agree, agree, undecided, no opinion, disagree, and strongly disagree. Values of 10, 8, 5, 5, 2, or 0 were assigned to these responses when the statement reflected a favorable attitude. The values were revised when agreement with the statement would have indicated an unfavorable attitude. An average score of 10 indicated a highly favorable attitude whereas 0 indicated a highly unfavorable attitude. Certain attitude questions offered yes, no opinion, and no as possible answers. A yes response showed a favorable attitude and was given 10 points followed by 5 and 0 for the other responses. All coding and scoring took into consideration future analyses making use of the IBM 083 sorter and the IBM 7040 and 1401 computers.

Prior to the actual coding and scoring, each questionnaire was given a 4-digit identification number starting with 0001. This was followed by a 2-digit number used to identify the person conducting the interview. The 4-digit numbers were assigned in blocks to indicate the city in which the interview had been conducted and whether it was before or after the experimental treatment. These 6 numbers were punched into the first 6 columns of each data card.

## Sampling

Certain criteria for sampling were established in the light of the objectives of the research program. The study groups were drawn from 2 Virginia cities, each of which had a population of 75,000 or more. Richmond and Roanoke were chosen. The experimental educational treatment was made in Richmond only, with Roanoke serving as a control. Interviewing was done in both cities before and after the Richmond experimental treatment. The 1960 census tracts (20) of each of the cities were used to determine areas of middle and upper-middle income dwellers. Extension Agents from Richmond and Roanoke then marked off areas within each tract which did not fit into the desired category because of shifts in population after 1960. The revised area delineations and appropriate maps were studied by a statistical consultant[4] who set up the random sampling within the limitations that the interviewee live in an unattached, single-unit dwelling, and that an equal number of homemakers and male heads of households be included.

Random samples were chosen through area sampling methods based on statistical techniques. Enough samples were drawn so that 1200 valid questionnaire would come from Richmond; 600 before the educational program, and 600 after the program. The elimination of incomplete and/or invalid questionnaires provided a final count of 600 before and 597 after the treatment. In Roanoke 400 samples were desired; 200 at the time Richmond was sampled the first time, and 200 when Richmond was sampled after the treatment. A few additional valid questionnaires remained, so the final count was 201 before and 213 after the experimental treatment. In each city, 50 post-treatment samples were second interviews; individuals who had been interviewed in the pretreatment group. A professional consulting firm[5] in Richmond was commissioned to conduct the interviews in both cities.

## TREATMENT

The experimental treatment, or planned communication program,was developed as a joint effort. Personnel from the Chemical, Drug and Pesticide Unit worked closely with our Extension News Editor, Information Editor, Publications Editor, TV Supervisor, Radio Supervisor, Photographer, Art Director, Motion Picture Supervisor, and specialists in Entomology, Plant Pathology and Physiology, and in Veterinary Science. USDA as well as private consultants also made contributions. The experimental treatment which was conducted from August 26 to September 22, 1966 followed a well-defined theme and used 4 mass media to broaden audience coverage and also to help determine which forms of mass media were the most effective in reaching the audience. The educational approach used included TV and radio spots and programs, newspaper releases, and an Extension publication.

### Television

Three stations serving the Richmond study area: WRVA, WTVR, and WXEX were each provided with a complete set of 10 spot announcements featuring a cartoon character called "Larry the Label" who was created by the Northeast Pesticide Coordinators as a regional project. The films were purchased specially for this study. Each spot ran from 20 to 60 seconds. Each station mentioned used the spots 30 times as between-program or station-break announcements.

[4] Dr. Charles E. Ramsey, Professor, University of Minnesota

[5] Psychological Consultants, Inc.
1804 Stamples Mill Road, Richmond, Virginia 23230

Seven special 9½ - minute TV programs were recorded on tape and were used by station WRVA-TV during the treatment period. Four of the programs were presented as inserts in the V.P.I. "Town and Country" program which is regularly scheduled at 6:15 AM. The other 3 programs were used as 3:00 PM Sunday afternoon specials under the title of "Pests or Plenty". Subjects included need for pesticides; use around the home, garden, and on pets; safe disposal; application equipment; pesticide definitions; and the pesticide label.

Radio

Four 5-minute tapes were produced on campus by VPI Extension Specialists for use by WRVA-Richmond as inserts in their regular Tuesday morning V. P. I. Extension information broadcasts which are scheduled from 6:00 to 6:30 AM. The same 4 tapes were used by WTVR-Richmond during the regular V.P.I. broadcast from 6:30 to 6:45 AM. Subjects include a description of pesticides; the pesticide label; safe use in the home; safe use on pets and livestock; and safe disposal of containers.

Additionally, the pesticide information effort included the distribution to WRVA, WLEE, and WTVR (all of Richmond) of a special disc recording presenting 1-minute spot announcements by several celebrities, among them Arthur Godfrey, Zsa Zsa Gabor, Eddie Albert, and Kukla, Fran, and Ollie. These stations were not asked to make a log search to determine the actual usage of the recordings, but information specialists were assured by station management that the spots were used "generously".

Newspaper

The press phase of the communications program was confined to the Richmond Times-Dispatch. This paper had the largest circulation in the study area and had the added advantage of running a Sunday section. Four stories were prepared, the first being very general, while the others covered subjects related to pesticides in the home, pest control in state parks, and how the proper use of pesticides helped a boy grow a successful garden. All were illustrated. Although only the first general story was used, it received good coverage across 6 columns, with 1 picture being used.

Extension Publication

A brief story on the need for pesticides, their uses, and handling precautions was compiled into a Cooperative Extension pamphlet entitled Passport To A Better Life. The topic outline was developed by the Chemical, Drug and Pesticide Unit. Writing, editing, and designing was done by members of the Information staff. Printing was done commercially in 2 colors on buff paper with light green front and back covers. A black and white reproduction of the pamphlet is included as Appendix E.

A distribution of 50,000 copies of the pamphlet was made to the office of the Henrico County Extension Agent, Agriculture for redelivery to selected locations in the treatment area. The locations included 2 medical centers, 18 hardware stores that handled pesticides, 7 schools, and 7 garden supply centers. Two or 3 trips were made to each location to replenish supplies. Distribution at most locations was on a free choice basis; however, the schools gave the pamphlets directly to the pupils and a few of the stores put them in with the customers' purchases. In total, about 13,000 copies were distributed. At the conclusion of the treatment period, the remaining 37,000 were returned to V.P.I. to be used in statewide programs.

## ANALYSIS OF DATA

After the questionnaires had been coded and scored, the results were punched into IBM cards. Codes were punched into one series of cards and scores into another. All cards were cross-referenced so that individual responses could be retreived if necessary. Pre- and post-treatment cards were color-coded to facilitate programming.

A frequency analysis for the entire study was programmed on the IBM 7040 computer. Small separations involving fewer cards were made on the IBM 083 sorter.

Average scores were derived by first taking an individual's total score in a specific category and dividing it by the number of variables that he attempted. The resulting figure was considered a numerical level of attainment in that category. These individual level values were then summed and divided by the number of individuals in the sample to give an average score, or attainment value for the sample. These operations were all programmed on the IBM 7040 and 1401 computers. Standard deviations also were calculated for future use in studying significance of differences by means of a programmed "Student t" test (11).

The significance of difference between percentages was determined through the use of Davies' test (7) and was not programmed on the computer. The Chi square test was used as needed, but it also was not programmed.

## RESULTS

The results obtained in this study will be summarized under 5 headings:

A) Sub-study of urban women based on use or non-use of pesticides as related to selected profile characteristics.
B) Selected profile of the entire pre-treatment audience.
C) Benchmarks of knowledge and attitude prior to the experimental treatment.
D) Effect of a planned communication program.
E) Relative effectiveness of mass media used.

### Selected Headings

### A) Sub-study of urban women based on use or non-use of pesticides as related to selected profile characteristics.

Graham (13) made a sub-study of 394 women in the pre-treatment sample. Her report is reproduced as Appendix B. It is summarized as follows:

Of the 394 urban women, 77.4% were users of pesticides whereas the remaining 22.6% were non-users.

Pesticide use was independent of the age group in which the respondents were catagorized. The place of early residence (before 18 years of age) had no significant influence as to whether the women used or did not use pesticides. Over ½ of the middle class urban women in the sample spent their early years of residence in the city.

The users of pesticides had obtained a significantly higher educational level than had the non-users. A higher percentage of the higher education group (users) were members of certain selected organizations, showed greater concern about environmental pollution, and were involved in more special interest activities.

Although slightly less than ½ of the middle class urban women were members of the selected organizations, more of the users (49.8%) were members than were the non-users (37.1%).

A frequency analysis showed that three out of four middle and upper-middle class urban women read books and a majority participated in raising and arranging flowers. A higher percentage of users participated in all of the special interest activities than did the non-users.

A later study of the general attitude tabulations used by Graham has revealed that a clerical scoring error had been made. The corrected data are not reflected in Graham's thesis. Therefore, the attitude comparisons made in Tables 13, 14, and 16 merely show trends, but are not valid statistically.

## B) Selected profile characteristics of the entire pre-treatment audience prior to the experimental treatment.

### 1. Age

Before a meaningful educational program can be designed for a specific audience it is essential to determine the age group or groups involved. This determination is relatively easy for certain audiences, e.g. young marrieds, senior citizens, adolescents, etc. It becomes more difficult, however, when a broad socio-economic group such as the middle and upper-middle income urban dweller is concerned. Table 1 summarizes the distribution of ages found in our sample population.

The largest number of people in the test population fell into the 40-49 year age group. This group was not significantly larger (5% level) than its closest rival, the 50-59 year group, according to Davies' test for significance of differences between percentages (7). These 2 groups totaled 44.2% of the sample. Pesticide use was not dependent on age.

Table 1. Distribution of age groups within the test population.

| | Total | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| Age | # | % | # | % | # | % |
| 15-19 | 10 | 1.3 | 8 | 80.0 | 2 | 20.0 |
| 20-29 | 78 | 9.8 | 64 | 82.1 | 14 | 17.9 |
| 30-39 | 124 | 15.6 | 96 | 77.4 | 28 | 22.6 |
| 40-49 | 192 | 24.1 | 158 | 82.3 | 34 | 17.7 |
| 50-59 | 160 | 20.1 | 127 | 79.4 | 33 | 20.6 |
| 60-69 | 143 | 17.9 | 115 | 80.4 | 28 | 19.6 |
| 70 + | 89 | 11.2 | 63 | 71.0 | 26 | 29.0 |
| Total | 796 | 100.0 | 631 | 79.3 | 165 | 20.7 |

2. Educational attainment

It should be obvious that an educational program can be made more effective if it takes into account the educational level of the audience. Table 2 summarizes the levels of educational attainment represented in our sample.

Table 2. Educational levels attained by the test population

| Level | Total | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | # | % | # | % | # | % |
| Elementary (1 through 8 grade) | 77 | 9.6 | 48 | 62.3 | 29 | 37.7 |
| High School (1 to 3 years) | 108 | 13.5 | 81 | 75.0 | 27 | 25.0 |
| High School (graduate) | 256 | 32.0 | 198 | 77.3 | 58 | 22.7 |
| College (1 to 3 years) | 127 | 15.9 | 102 | 80.3 | 25 | 19.7 |
| College (graduate or beyond) | 233 | 29.0 | 206 | 88.4 | 27 | 11.6 |
| Total | 801 | 100.0 | 635 | 79.3 | 166 | 20.7 |

The data in Table 2 indicate a reasonably high level of educational attainment in our urban sample. A high school education or beyond was claimed by 76.9% of the respondents. College degrees had been attained by 37.8% of this group. Pesticide use was related to educational attainment. Davies' test (7) showed that there were significantly more non-users than users in the group that had not completed high school, whereas the reverse was true in the group of high school graduates and above. All comparisons were made at the 5% level of probability.

3. Place of early residence

The area in which our test audience had lived during their first 18 years of life was considered an integral part of the profile study. An associated question involved whether place of early residence would influence use or non-use of pesticides. The results of the evaluation are summarized in Table 3.

Table 3. Distribution of test sample based on place of residence prior to 18 years of age.

| | Total | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| Location | # | % | # | % | # | % |
| Farm or ranch | 163 | 20.3 | 127 | 77.9 | 36 | 22.1 |
| Country | 72 | 9.0 | 54 | 75.0 | 18 | 25.0 |
| Town | 90 | 11.2 | 73 | 81.1 | 17 | 18.9 |
| City | 475 | 59.5 | 380 | 80.0 | 95 | 20.0 |
| Total | 800 | 100.0 | 634 | 79.2 | 166 | 20.8 |

The majority, 59.5% of the middle and upper-middle class urban dwellers interviewed, were raised in the city. Farm or ranch background accounted for 20.3%, which was significantly higher than either of the other two categories. A chi-square test demonstrated that place of early residence did not influence use or non-use of pesticides.

4. Membership in selected organizations

It was felt that a profile based on membership in certain organizations would be helpful in defining the urban audience as well as in providing information regarding possible outlets for Extension information. The membership distribution is summarized in Table 4.

More people in the test group belonged to the PTA than to any other of the selected organizations. Garden clubs and sportsmen's clubs were next in membership but their number fell well below that of the PTA. Within each organization there were significantly more users than non-users of pesticides. This fact is not significant,however, because in most cases the numbers did not differ greatly from the distribution of users and non-users in the entire sample.

Table 4. Distribution of sample based on membership in certain organizations.

| Organization | Total # | Total %* | Users # | Users %* | Non-Users # | Non-Users %* |
|---|---|---|---|---|---|---|
| PTA | 221 | 27.6 | 186 | 84.1 | 35 | 15.9 |
| Garden Club | 37 | 4.6 | 30 | 81.1 | 7 | 18.9 |
| Sportsmen's Club | 35 | 4.4 | 28 | 80.0 | 7 | 20.0 |
| Home Demonstration Club | 13 | 1.6 | 8 | 61.5 | 5 | 38.5 |
| League of Women Voters | 12 | 1.5 | 10 | 83.3 | 2 | 16.7 |
| Rotary | 11 | 1.4 | 10 | 90.9 | 1 | 9.1 |
| A.A.U.W. | 8 | 1.0 | 7 | 87.5 | 1 | 12.5 |
| Toastmasters Club | 6 | 0.7 | 5 | 83.3 | 1 | 16.7 |
| Lions | 5 | 0.6 | 5 | 100.0 | 0 | 0.0 |
| Kiwanis | 5 | 0.6 | 5 | 100.0 | 0 | 0.0 |
| Audubon | 2 | 0.2 | 2 | 100.0 | 0 | 0.0 |

* % will not total 100 because respondents may have belonged to more than 1 organization or to none of those listed. Based on a sample of 801.

5. Special interests

Another step toward getting to know our urban audience was a determination of involvement in certain special interest activities. The distribution is summarized in Table 5.

Nearly 3/4 of the respondents showed interest in reading books and over half participated in raising flowers. Very little interest was shown in collecting insects.

Table 5. Distribution of sample based on hobbies and special interests.

| Special interest | Total (801) # | Total (801) %* | Users # | Users % * | Non-Users # | Non-Users % * |
|---|---|---|---|---|---|---|
| Reading Books | 577 | 71.9 | 474 | 82.1 | 103 | 17.9 |
| Raising Flowers | 433 | 54.0 | 352 | 81.3 | 81 | 18.7 |
| Swimming | 340 | 42.3 | 285 | 83.8 | 55 | 16.2 |
| Fishing | 308 | 38.4 | 252 | 81.8 | 56 | 18.2 |
| Discussion Groups | 276 | 34.4 | 235 | 85.1 | 41 | 14.9 |
| Flower Arranging | 266 | 33.2 | 209 | 78.6 | 57 | 21.4 |
| Vegetable Gardening | 219 | 27.3 | 184 | 84.0 | 35 | 16.0 |
| Boating | 190 | 23.7 | 161 | 84.7 | 29 | 15.3 |
| Hiking | 153 | 19.1 | 131 | 85.6 | 22 | 14.4 |
| Camping | 129 | 16.1 | 105 | 81.4 | 24 | 18.6 |
| Bird Watching | 128 | 15.9 | 108 | 84.4 | 20 | 15.6 |
| Hunting | 117 | 14.6 | 96 | 82.1 | 21 | 17.9 |
| Nature Study | 109 | 13.6 | 98 | 89.9 | 11 | 10.1 |
| Golf | 105 | 13.1 | 91 | 86.7 | 14 | 13.3 |
| Collecting Insects | 10 | 1.2 | 10 | 100.0 | 0 | 0.0 |

* %'s will not total 100 because respondents may have checked more than one interest.

6. General observations

Frequency determinations sorted out from the interview schedules illustrated certain other characteristics of the urban sample. These are summarized in Table 6.

Table 6. Miscellaneous profile characteristic of the Roanoke and Richmond total sample.

| Item | Number | Percent |
|---|---|---|
| Owned TV | 769 | 95.0 |
| Owned radio | 723 | 89.8 |
| Took daily paper | 786 | 97.2 |
| Took Sunday paper | 766 | 94.9 |
| Used pesticides | 635 | 79.0 |
| Owned a dog(s) | 285 | 35.5 |
| Owned a cat(s) | 132 | 16.5 |
| Bought a fishing license | 162 | 20.2 |
| Children under 15 yrs. at home | | |
| 0 | 510 | 63.9 |
| 1-3 | 255 | 32.0 |
| 4 or more | 33 | 4.1 |

These observations are offered merely to help round out a picture of the segment of a middle and upper-middle class urban audience sampled in this study.

## C) Benchmarks of knowledge and attitude prior to the experimental treatment.

Within the framework of this study, benchmarks were considered as numerical evaluations of the middle and upper-middle class urban dweller's attitude toward and knowledge of pesticides and the role of the government in regulating their use. The research plan called for establishing benchmarks under 4 categories; knowledge general, knowledge government, attitude general, and attitude government.

The pre-treatment, or "before" benchmarks measured the levels characterizing the test sample prior to being exposed to a planned communication program. Post-treatment or "after" benchmarks were established to determine the effectiveness of the educational program.

The following tables present benchmarks for the entire test populations as well as for the control and the experimental groups. Benchmarks for the total group were established by Bush (5) in a sub-study of these data.

Table 7. Average levels of knowledge and attitudes of the combined Roanoke and Richmond, Virginia urban samples, July-August, 1966, prior to an experimental treatment.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Benchmark before treatment | 3.72407 | 2.51132 | 6.90101 | 5.37037 |
| Benchmark attainable | 5.30000 | 7.50000 | 10.00000 | 10.00000 |
| Percent attained | 68.37 | 33.48 | 69.01 | 53.70 |

N = 801

The data in Table 7 indicate above-average general knowledge and attitudes regarding pesticides. Attitude toward government regulation was slightly above average while knowledge of the government's role in pesticide regulation was well below average. Bush (5) points out that the knowledge scores follow a pattern reported for Iowa farmers by Beal et al (3). These observations indicate that an Extension educational program on pesticides for urban or rural audiences should give particular emphasis to the role of the government in pesticide regulation and consumer protection.

The same statistical techniques for sampling were used in both Roanoke and Richmond. As previously stated, Roanoke was designated as the control area and Richmond as the treatment area. It then became necessary to test the validity of this decision. The test is summarized in Table 8.

Table 8. Average levels of knowledge and attitude of the separate Roanoke and Richmond, Virginia urban samples, July-August, 1966, prior to an experimental treatment.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Roanoke | 3.59566 | 2.50138 | 6.89088 | 5.29229 |
| Richmond | 3.63359 | 2.51465 | 6.90442 | 5.39653 |
| | Analysis | | | |
| Difference in scores | 0.03793 | 0.01327 | 0.01354 | 0.10424 |
| t-value | -0.518 | -0.083 | -0.134 | -0.593 |
| Significance at 5% | NS | NS | NS | NS |

df = 799

The data in Table 8 show no significant differences in pesticide knowledge and attitude levels in the 2 urban samples. It was concluded that Roanoke would serve as a reliable control for the experiment.

D) Effectiveness of the planned communication program.

After the pre-treatment interviews had been completed, the experimental treatment, or planned communication program was initiated in Richmond. The program has been discussed in an earlier section. It was conducted from August 26 to September 22, 1966.

Post-treatment interviews were initiated at the conclusion of the treatment. Randomization of the individuals to be interviewed followed the plan used previously. In addition, 50 pre-treatment interviewees were selected at random in both Roanoke and Richmond. In practice, more than the required numbers were selected to allow for refusal or unavailability.

The post-treatment questionnaires were coded and scored and the results were analyzed at the VPI Computer Center. The benchmarks and comparisons are summarized in the following tables.

Table 9. Average levels of knowledge and attitude of the control (Roanoke) sample and the treated (Richmond) sample, October-November, 1966.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Roanoke (control) | 3.78018 | 2.32986 | 6.90323 | 5.04343 |
| Richmond (treatment) | 3.53788 | 2.28545 | 6.99089 | 4.94975 |
| | Analysis | | | |
| Difference in scores | 0.24230 | 0.04441 | 0.08766 | 0.09368 |
| t-value | 3.286 | 0.293 | -1.015 | 0.562 |
| Significance at 5% | S | NS | NS | NS |

df = 808

Prior to the experimental treatment there was no significant difference in any of the 4 knowledge and attitude categories between the control and experimental groups (Table 8). However, the data in Table 9 show that there was a significantly higher level of general knowledge in the control group after the treatment. This development is difficult to explain because the Extension education program was not conducted in Roanoke. Post-treatment interviews show some accidental exposure, no doubt due to individuals in the control group traveling in the treatment area during the time that the program was being conducted. It is also possible that general information had been made available by pesticide manufacturers, dealers, the USDA, or other organizations.

Before and after scores in Roanoke and Richmond are compared in the following 4 tables. Table 10 summarizes the scores for the Roanoke reinterview group which was composed of individuals who were interviewed both before and after the Richmond treatment. Original plans called for 50 interviews but a recording error made it impossible to relate 2 schedules to the original individual. Therefore the Roanoke group was reduced to 48.

Table 10. Average levels of knowledge and attitude of the reinterview control group in the Roanoke control sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Pre-treatment | 3.52119 | 2.65327 | 6.97870 | 4.86111 |
| Post-treatment | 3.76304 | 2.52199 | 7.01667 | 4.69097 |
| | Analysis | | | |
| Difference in scores | 0.24185 | 0.13128 | 0.03797 | 0.17014 |
| t-value | -1.502 | 0.317 | -0.168 | 0.421 |
| Significance at 5% | NS | NS | NS | NS |

df = 94

The above data show that there was no significant change in the reinterview group. Although general knowledge approached significance at the 5% level (calculated t=1.502, required for significance, 2.01). This trend has an impact on the comparisons in Table 11.

Table 11. Average levels of knowledge and attitudes in the total Roanoke control sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Pre-treatment | 3.59566 | 2.50138 | 6.89088 | 5.29229 |
| Post-treatment | 3.78018 | 2.32986 | 6.90323 | 5.04343 |
| | Analysis | | | |
| Difference in scores | 0.18452 | 0.17152 | 0.01235 | 0.24886 |
| t-value | -2.209 | 0.963 | -0.114 | 1.242 |
| Significance at 5% | S | NS | NS | NS |

df = 412

Table 11 shows that when the total Roanoke Control group was evaluated a significantly higher level of general knowledge was demonstrated in the post-treatment interviews. This same phenomenon was noted previously when the control was compared with the Richmond experimental group (Table 9). Possible reasons for this development were discussed.

Table 12. Average levels of knowledge and attitudes of the reinterview group in the Richmond treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Pre-treatment | 3.76802 | 2.18325 | 7.07600 | 5.65833 |
| Post-treatment | 3.63821 | 2.09972 | 7.18600 | 5.05000 |
| | Analysis | | | |
| Difference in scores | 0.12981 | 0.08353 | 0.11000 | 0.60833 |
| t-value | 0.824 | 0.221 | -0.436 | 1.335 |
| Significance at 5% | NS | NS | NS | NS |

df = 98

Table 12 shows that the experimental treatment did not change significantly the pesticide knowledge or attitude of the Richmond reinterview group. Possible reasons for lack of measurable change will be discussed later.

Table 13. Average levels of knowledge and attitudes of the total Richmond treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Pre-treatment | 3.63359 | 2.51465 | 6.90442 | 5.39653 |
| Post-treatment | 3.53788 | 2.28545 | 6.99089 | 4.94975 |
| | Analysis | | | |
| Difference in scores | 0.09571 | 0.22920 | 0.09647 | 0.44678 |
| t-value | 1.777 | 2.009 | -1.267 | 3.593 |
| Significance at 5% | NS | S | NS | S |

N = 1195

Table 13 presents a rather perplexing problem. The data show that after the experimental treatment the total Richmond sample had a significantly lower level of knowledge of government pesticide regulatory activities and had a significantly less favorable attitude toward government regulations of pesticides and their use. On the surface, one might conclude that the Extension educational program had an adverse effect in these 2 categories. This is difficult to believe, however, because the program stressed correct information and favorable attitudes. It is possible that the audience was exposed, during the treatment period, to publicity on governmental regulations which could have been misinterpreted. Misinformation regarding food contamination, pesticide accidents, or government inspections might have produced negative responses.

Another possible explanation must be considered. There is insufficient evidence available to allow for a clear definition of normal variation in knowledge and attitudes of an urban audience regarding pesticides. It is possible that in test samples of the size used in this study that the unexplained significant differences were really an expression of normal variation. This suggestion is supported by changes in the control before and after the treatment (Table 11) and the subsequent improvement of the control over the treatment (Table 9).

The data in the foregoing tables lead to the conclusion that the experimental treatment, or planned communication program was not effective in producing the desired changes in the urban audience.

## E) Relative effectiveness of mass media used.

Although the experimental treatment did not bring about the desired change in the test population, a detailed analysis of the mass media used has provided some guideposts for future program development. This phase of the over-all study has been reported by Hamilton (14). His complete report is included as Appendix D. The following observations are summarized for the report.

The communications program reached 140 people in the total sample of 597 (23.45%). Frequency data showed that 117 people had been reached by only 1 of the media used, 21 had been reached by any 2 media, and 2 had been reached by 3 of the 4 media. No one in the sample had been reached by all 4 media.

A breakdown of contacts made by each medium used in the program showed that television reached 103 people (17.25%), radio 24 (4.02%), newspaper 12 (2.01%), and the publication 26 (4.35%). Compared to media coverage criteria reported in the literature, the coverage in this experimental treatment was inadequate.

Of the contacts made, television made 103 (62.42%), radio (14.55%), newspaper 12 (7.27%), and the publications 26 (15.76%). Even though the coverage was not wide enough to cause significant changes in knowledge and attitudes of the entire test population, those people who were reached showed a degree of response to the program. It is questioned however, whether these responses have any true meaning in judging the effectiveness of the informational program.

The 103 people reached by television had a significantly higher "knowledge government" score than did the 494 who were not reached. Scores for the other categories remained unchanged. The "Larry the Label" spots were remembered by 98 people, 4 of whom also recalled a VPI-produced program. The remaining 5 people remembered a VPI program only.

"Attitude government" scores were higher for the radio contacts than for the non-contacts (24 vs. 585). No knowledge or attitude change was found in the 26 people who remembered seeing the pamphlet.

The significant differences which developed are difficult to explain because the government's role in chemical pesticides was not emphasized to a greater extent than other elements in the informational program, yet significant differences appeared only in these categories.

All mass media contacts (140) had a significantly higher "knowledge government" score than did the no contacts (457). However, Table 13 shows that when the entire before and after samples were compared there was a decrease rather than an increase in this category.

Hamilton (14) concludes that too few people were contacted by the total program and that each medium fell short of achieving its potential reach. Significant differences which appeared in certain specific divisions of the sample feel without pattern and held no obvious relationship to each other. It is doubtful that these differences are a true measure of the effectiveness of the program.

## DISCUSSION AND CONCLUSIONS

The data summarized from this study lead to the conclusion that the experimental treatment or planned Extension communication program failed to improve the middle and upper-middle class urban dweller's knowledge of and attitude toward pesticides and the government's role in regulating their use. This study has brought out several possible explanations for the failure and has pointed out possible avenues for improvement.

The time at which the VPI-produced television programs were put on the air is thought to have contributed to the lack of success of the informational program. The hours between 5 and 7 AM were not popular viewing hours for the urban sample. A frequency analysis showed that only 1.7% of the sample usually watched television during these hours.

Afternoon viewing was somewhat more popular. However, of the 80 people who watched television between noon and 4 PM, only 1 person remembered a VPI 3 PM pesticide program.

An analysis of viewer recall covering all telecasting hours showed that 61 people saw a program which mentioned pesticides but that only 1 (1.6%) recognized a VPI-produced program.

The foregoing observations lead to the conclusions that, 1) the early morning viewing hour was not the proper time to try to reach the urban audience with an informational program on pesticides, and 2) the quality of the programs was such that no lasting impression was made on the people who were exposed to them.

The cartoon character "Larry the Label" was the most successful single item in the program. In all, 98 people (16.5%) remembered seeing "Larry". This reach may have been due to the quality of the production, its brevity, its entertainment value, the number of times it was used, and when it was used.

It is difficult to explain why radio did not have a greater reach. The hours between 5 and 9 AM were designated as the most popular, claiming 201 listeners (33.7%) in our sample audience, yet only 24 people (4.0%) remembered 1 of the VPI pesticide information tapes. The quality of the programs may have influenced impact, as well as the fact that they were in competition with news and the weather.

Why only 1 out of 4 newspaper feature stories was used remains a mystery. All were considered to be of high quality and were well illustrated. The suggestion has been offered that although editors will accept news items from outside sources, many prefer to have their own writers prepare feature stories as directed.

The publication, Passport To A Better Life was considered a quality production yet it was recalled by only 26 people (4.35%) in the sample audience. This raises a question as to whether the pamphlet lacked impact or whether free choice distribution was the best method of reaching the audience.

The time of year at which the informational program was presented, August 26 to September 22, may have had some influence on its success. Although much of the program was oriented toward a clean and abundant harvest and to all phases of safe use of pesticides, which is a year-round problem, it is felt that more emphasis is placed on pests and pesticides in the spring than in the fall. This feeling is supported by the fact that Extension Specialists and Agents receive far more requests in the spring for information on pests and pesticides than they do in the fall. In view of the content of the program, the influence of timing may not have been significant, but must be kept in mind when future programs are considered.

Most Extension communication programs in the past have developed without the guidance of audience benchmarks or a clearly defined audience profile. This study has demonstrated that a traditional-type informational program did not succeed in changing knowledge and attidude of an urban audience regarding pesticides. Evaluation of the data obtained in the study has aided in formulating recommendations which may assist in designing future pesticide information programs, as well as programs in other subject matter areas for the urban audience.

## RECOMMENDATIONS

1) The educational level and wide range of interests and involvement suggests that pesticide informational programs for the urban audience must be prepared at a highly professional level and be sufficiently sophisticated and entertaining to allow them to compete successfully with other demands on the audience's time.

2) Consideration should be given to buying prime television time as a means of getting Extension's message to the public more effectively. Prime time for our urban sample was after 6 PM. This might be different for other audiences, however.

3) Extension's traditional methods of using mass media should be evaluated in the light of the urban audience. The evaluation should consider current research results in all fields of communication, and for each medium used in existing programs.

4) Extension should establish a closer relationship with city editors to insure that feature stories get the desired newspaper coverage.

5) Program planners must take every effort to know their audience. Prior information on special interests, hobbies, membership in organizations, educational level, listening and viewing habits, and other

characteristics can be most helpful in directing and presenting a program which will appeal to the intended audience.

6) Current levels of knowledge and attitudes should be established prior to planning an educational program. These benchmarks are useful not only in setting the level and scope of the program but also as reference points upon which program evaluations may be based.

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Va. Coop. Extension Service
Virginia Polytechnic Institute

Budget Bureau No: 40-6673
Approval Expires: Dec. 31, 1966

Summer 1966

Address of respondent ______________________________

Date of interview ______________ Interviewer's name ______________

## CHEMICAL-PESTICIDE STUDY

I am representing the College of Agriculture of Virginia Polytechnic Institute which is making a study of the interests and needs of the people of Virginia in the use of pesticides on the farm, in the yard, and in the home.

When I say pesticides, I mean chemicals that are used to kill pests such as insects, weeds, plant diseases, rats, and mice.

1. Have you, yourself, ever used any pesticide? Yes (1) ☐ No (2) ☐

IF NO, SKIP TO INTRODUCTION TO QUESTION 3.

IF YES, ASK:

1a. To kill weeds? .............................. Yes (1) ☐ No (2) ☐

1b. To kill insects inside the house? ............ Yes (1) ☐ No (2) ☐

1c. To kill insects outside, on the lawn, in flowers, on vegetable garden? ...................................... Yes (1) ☐ No (2) ☐

1d. To kill mice or rats? ...................... Yes (1) ☐ No (2) ☐

1e. To control plant diseases such as black spot on roses? ......................... Yes (1) ☐ No (2) ☐

IF YES TO 1a. ASK:

2. How often would you say you use weed killer? CHECK ONE

Less than once a year ......................... (1) ☐

Once or twice a year ......................... (2) ☐

Once a month during the growing season ....... (3) ☐

More than once a month during growing season ................................ (4) ☐

IF YES TO 1c. ASK:

2a. How often would you say you use insect killers outside the house? CHECK ONE

Less than once a year ........................ (1) ☐

Once or twice a year ........................ (2) ☐

Once a month during the growing season ....... (3) ☐

More than once a month during growing season ........................................ (4) ☐

As you perhaps know, farmers and public health workers use pesticides to control and destroy the weeds and insects that attack plants, animals, and people. Some people have expressed concern over the possible dangers of the use of such pesticides.

3. Have you ever seen this matter - possible dangers of the use of pesticides - discussed on T.V.?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

4. Have you ever heard this matter discussed on the radio?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

5. Have you ever read about it in magazines or books?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

6. Have you ever discussed it with relatives or members of the family?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

7. Did your friends ever bring this subject up in a conversation?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

8. Have you ever attended a group meeting where such a concern was the topic of discussion?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

9. Are foods checked for the presence of pesticides before they are sold?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

IF NO OR DON'T KNOW - SKIP TO QUESTION 10.

IF YES, ASK:

9a. You mean all foods? ..........................(1) ☐

Or some foods? ..................................(2) ☐

9b. Will you look at this card (A) and tell me who from this list does the checking?

CHECK ALL THAT APPLY.

1. Grower .............. ☐
2. Federal Government .. ☐
3. The store ........... ☐
4. State government .... ☐
5. Wholesaler ............. ☐
6. Other (Specify) ______________
7. Don't know ............. ☐

IF YES TO FEDERAL GOVERNMENT, ASK:

9c. Do you know which department or agency in the Federal Government is responsible for doing the checking?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9d. Which ones?

USDA (1) ☐ HEW (FDA) (2) ☐ Other (3) ☐

IF YES TO STATE GOVERNMENT, ASK:

9e. Do you know which Department or agency in the State Government is responsible for doing the checking?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9f. Which ones?

Virginia Dept. of Agr. ☐ Others ☐

9g. Are there any Federal laws controlling the amount of pesticides that may be in food?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9h. What are the names of the laws?

______________________________

______________________________

______________________________

10. Do you believe that the government is doing all it can to adequately protect you from possible poisoning by pesticides?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

11. Will you look at this card (B) and tell me which of the items you believe to be correct?

Federal government control of pesticides includes:

a. Direct supervision of pesticide manufacturing and packaging plants .................................. ☐

b. Allowing sale only if pesticide can be used safely .................................................. ☐

c. Allowing sale only if pesticide does what the manufacturer says it will ........................ ☐

d. Permitting sale of the most poisonous pesticides only to farmers ................................ ☐

e. Control of statements on pesticide label ................ ☐

f. Setting retail prices of pesticides ..................... ☐

g. Don't know .............................................. ☐

h. No control .............................................. ☐

IF g. OR h. IS CHECKED, SKIP TO QUESTION 13.

12. Will you look at this card (C) and tell me which of these things the Government should do?

CHECK ONLY ONE

Remove all controls on the use of pesticides ............ (1) ☐
Remove some controls on the use of pesticides ............ (2) ☐
Leave all controls as they are ........................ (3) ☐
Put some more controls on the use of pesticides .......... (4) ☐
Put a lot more control on the use of pesticides .......... (5) ☐
Don't know ........................................ (6) ☐

13. Do manufacturers warn users when their pesticide is poisonous?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

IF YES, ASK:

13a. When they do warn users, how do they do it?

On the label (1) ☐ Other (2) ☐ Don't know (3) ☐

IF THE RESPONDENT ANSWERED NO TO QUESTION 1 ON PAGE 1 (NEVER USED ANY PESTICIDES) NOW SKIP TO QUESTION 25.

14. When you use a pesticide which you have used before, do you read the label, or do you remember how to use it without reading it again?

Read (1) ☐ Remember how (2) ☐ Other (3) ☐

15. Are there any particular directions on labels you can't understand or follow?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES, ASK:

15a. Can you tell me what some of them are?

16. Do you happen to know what word is used to describe the amount of pesticide allowable by law in food or food products?

Tolerance (1) ☐ Other answer (2) ☐ Don't know (3) ☐

17. Where do you keep pesticides when you are not using them?

CHECK AS MANY AS APPLY

a. In the garage ............ ☐
b. In a garden tool shed .... ☐
c. In the kitchen ........... ☐
d. In the basement ....... ☐
e. Other (Specify) ____________

18. Would you say that all, most, some, or none are stored out of reach of children or pets?

All (1) ☐ Most (2) ☐ Some (3) ☐ None (4) ☐

19. Are all, most, some, or none stored under lock and key?

All (1) ☐ Most (2) ☐ Some (3) ☐ None (4) ☐

20. Have you ever used aerosol bombs containing pesticides?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 21

IF YES, ASK:

20a. What do you do with them when they are empty? CHECK AS MANY AS APPLY

a. Throw in trash pick-up ........................ ☐
b. Burn ........................................... ☐
c. Throw away .................................... ☐
d. Bury ............................................ ☐
e. Other (Specify) ________________________________

21. What do you do with empty containers of pesticides other than aerosol bombs? CHECK AS MANY AS APPLY

a. Burn, if paper bag ............................ ☐
b. Throw in trash pick-up ........................ ☐
c. Bury ............................................ ☐
d. If bottles, wash and use for storage of other liquids ..................... ☐
e. Other (Specify) ________________________________
f. Don't use ...................................... ☐

22. What do you do with left-over pesticide spray material?
CHECK AS MANY AS APPLY

a. Dump on ground ☐

b. Leave in sprayer for next time ☐

c. Pour down drain ☐

d. Keep in a container, but not in sprayer ☐

e. Don't have any left over - make just what is needed ☐

f. Other (Specify) ______________________________

g. Have never used a pesticide in a sprayer ☐

23. Will you look at this card (D) and tell me which of these ways help you decide which pesticide to buy? CHECK AS MANY AS APPLY

a. Advertisement:

(a) In newspaper ☐
(b) On TV ☐
(c) On radio ☐
(d) In magazine ☐

b. Ask a friend ☐

c. Ask the Extension agent (county agent) ☐

d. Ask the storekeeper or clerk ☐

e. Ask a nurseryman ☐

f. Ask V.P.I. (Va. Tech) ☐

g. Ask the State Department of Agriculture ☐

h. Look through the various pesticides on the shelf at the store ☐

i. Read about the correct pesticide in a book, magazine, or recommendation sheet ☐

j. Use the one I have used for years ☐

k. Family member told me what to buy ☐

l. Other (Specify) ______________________________

m. I don't buy them ☐

24. Will you look at this card (E) and tell me which of these methods you use to find out how to use a pesticide? CHECK AS MANY AS APPLY

- a. Ask a friend .................................... ☐
- b. Recall what I have read about it .................. ☐
- c. Read the instructions printed on the package ........ ☐
- d. Ask the person who sold it to me .................. ☐
- e. Ask the county agent .............................. ☐
- f. Ask a nurseryman .................................. ☐
- g. Look in bulletin or article I have seen about the pesticide ................................ ☐
- h. Ask a family member ............................... ☐
- i. Other (Specify) ____________________________________

25. I have some books listed here. As I name each one, will you tell me whether you have heard of it, whether you have read it, and whether it discusses pesticides?

| | Heard of? | Read? | Discusses Pesticides? |
|---|---|---|---|
| a. DEERSLAYER by James Fenimore Cooper ........... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |
| b. SILENT SPRING by Rachel Carson ........... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |
| c. TO KILL A MOCKINGBIRD by Harper Lee ....... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |
| d. BUGS OR PEOPLE? by Wheeler McMillen ......... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |

26. What effect do you think the use of pesticides has on the quality of foods produced: Improves quality, lowers quality, or has no effect?

Improves quality .............................. (1) ☐
No effect .............................. (2) ☐
Lowers quality .............................. (3) ☐
Improves some, lowers others .................... (4) ☐
Don't know .............................. (5) ☐

27. I have a short list of items here. As I read each one, will you tell me whether you think it is one of the results of the use of pesticides?

| | Yes (1) | No (2) | Don't know (3) |
|---|---|---|---|
| a. Control of malarial mosquitoes .............. | ☐ | ☐ | ☐ |
| b. Reduction of amount of sleeping sickness (equine encephalitis) ..... | ☐ | ☐ | ☐ |
| c. Reduction of the number of fish in some places or areas .................. | ☐ | ☐ | ☐ |
| d. Control of fleas and flies that carry disease ............ | ☐ | ☐ | ☐ |
| e. Reduction in the number of birds .......... | ☐ | ☐ | ☐ |

28. Will you look at all the items on this card (F), and then tell me which you think are the most significant or important effects of pesticides?

DO NOT CHECK ALL - CHECK ONLY MOST IMPORTANT

a. Kill ants .......... ☐
b. Protect apples from insects .......... ☐
c. Kill harmful bugs on food crops .......... ☐
d. Kill bugs on roses .......... ☐
e. Harm children and pets .......... ☐
f. Kill fish .......... ☐
g. Kill mosquitoes .......... ☐
h. Upset nature .......... ☐
i. Harm people using them .......... ☐
j. Kill robins .......... ☐
k. Protect shrubs from disease .......... ☐
l. Kill starlings .......... ☐
m. Kill weeds in lawn .......... ☐
n. None is important .......... ☐

29. Will you look at this card (G) and tell me whether you think the use of weed killers by farmers helps produce any of the listed results?

CHECK AS MANY AS APPLY.

a. More food .............. ☐
b. Less food .............. ☐
c. More expensive food ..... ☐
d. Cheaper food ........... ☐
e. Better food ........... ☐
f. Food dangerous to eat ............... ☐
g. None of these .......... ☐
h. Don't know ............ ☐

30. In general, do you feel pesticides make it easy for a person:

| | | | |
|---|---|---|---|
| a. To control insects or bugs? .............. | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| b. To control weeds? ................ | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| c. To control plant diseases? ........ | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| d. To control rats and mice? ......... | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |

31. Will you look at this card (H)? Do you believe any of these people are in any danger from the use of pesticides?

CHECK AS MANY AS APPLY.

| | QUESTION 31 | QUESTION 31a |
|---|---|---|
| a. The people who make the pesticides ........................ | ☐ | ☐ |
| b. Applicators (farmers or commercial persons who put the pesticides on) ............ | ☐ | ☐ |
| c. Harvesters of food ............... | ☐ | ☐ |
| d. Retail dealers (handlers, salesmen, warehousemen) ............ | ☐ | ☐ |
| e. Consumers who eat food treated with pesticides ............ | ☐ | ☐ |
| f. None is in danger ................ | ☐ | ☐ |

IF MORE THAN ONE WAS CHECKED FOR 31, ASK:

31a. Which one do you believe was exposed to the greatest risk?

CHECK ABOVE

IF b. for 31 (APPLICATORS) WAS NOT CHECKED - SKIP TO QUESTION 33.

32. If a farmer carefully follows the manufacturer's directions for use of pesticides, do you feel there is any danger to him?

Yes (1) ☐ No (2) ☐ Don't Know (3) ☐

IF YES,

32a. Would you say a great deal, some, or a very little?

A great deal (1) ☐ Some (2) ☐ Very little (3) ☐

33. What do you usually do before eating a raw apple or pear? CHECK ONLY ONE

Peel it .................................... (1) ☐
Wash it or rinse it .................... (2) ☐
Wipe it off .............................. (3) ☐
Nothing .................................... (4) ☐ SKIP TO QUESTION 34.

33a. Why do you do it?

________________________________________

________________________________________

________________________________________

34. Do you think in Richmond/Roanoke there are fewer birds than there used to be, more birds, or about the same number as always?

Fewer birds than there used to be .................. (1) ☐
More birds than there used to be .................. (2) ☐
About the same number as always .................. (3) ☐
Don't know .............................................. (4) ☐

IF FEWER, ASK:

34a. Why do you think there are fewer?

________________________________________

________________________________________

________________________________________

35. Do you feel that pesticide sprays and dusts endanger wildlife that may come into contact with them?

Yes (1) ☐ No (2) ☐ Don't Know (3) ☐

IF YES,

35a. Would you say: A great deal, some, very little, or none?

A great deal (1) ☐ Some (2) ☐ Very little (3) ☐

36. I am going to read a number of statements which one might hear concerning pesticides or their use. For each one, as I read it, will you indicate whether you Strongly Agree (SA) with the statement, Agree (A), are Undecided (U), Disagree with it (D), or Strongly Disagree (SD). These responses are listed on this card.

HAND RESPONDENT CARD (I).

Please consider each statement by itself and in its entirety when expressing your opinion.

a. In order to continue to produce an abundant supply of food, farmers must use pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

b. If pesticides were not used, people would be healthier and happier.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

c. The use of pesticides has done little to control the spread of pests.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

d. There is little reason to fear pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ Sd (5) ☐

No Opinion (6) ☐

e. If pesticides are used properly, people can avoid any harm from them.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

f. Farmers should be allowed to use pesticides as they choose.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

g. If pesticides were not used, the American people might become short of food.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

h. There have been deaths due to poor handling of pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

i. Pesticides should not be put in unlabeled bottles or bags.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

37. In general, do you feel pesticides are pretty dangerous to work with?

Yes (1) ☐ No (2) ☐ No opinion (3) ☐

38. Do you think that certain pesticides should be available only on a prescription basis, like many medicinal drugs for people?

Yes (1) ☐ No (2) ☐ No opinion (3) ☐

39. I would like to ask you how concerned you think various people or groups are about the possible harmful effects from the use of pesticides.

Here is a card (J) with a listing of degrees of concern that I would like you to use in answering my questions.

HAND CARD TO RESPONDENT AND READ CARD.

| | Not concerned about the effects (1) | A little concerned (2) | Quite concerned (3) | Very much concerned (4) | Don't know (5) |
|---|---|---|---|---|---|
| First of all how concerned are you? ........ | ☐ | ☐ | ☐ | ☐ | ☐ |
| How concerned are: | | | | | |
| The general public ................ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Chemical Manufacturers .......... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Congress .............. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Food & Drug Administration ......... | ☐ | ☐ | ☐ | ☐ | ☐ |
| U.S. Dept. of Agriculture ............ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Va. Dept. of Agriculture ............ | ☐ | ☐ | ☐ | ☐ | ☐ |
| State legislators ...... | ☐ | ☐ | ☐ | ☐ | ☐ |
| V.P.I. (Va. Tech) ...... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Extension agents ...... | ☐ | ☐ | ☐ | ☐ | ☐ |

40. Are the following of serious concern to you?

a. Pollution of the air by smoke .............. Yes (1) ☐ No (2) ☐ No opinion (3) ☐

b. Foreign relations ..... Yes (1) ☐ No (2) ☐ No opinion (3) ☐

c. Contamination from radioactive fallout .............. Yes (1) ☐ No (2) ☐ No opinion (3) ☐

d. Inflation ............ Yes (1) ☐ No (2) ☐ No opinion (3) ☐

e. Pollution of Virginia rivers and streams .... Yes (1) ☐ No (2) ☐ No opinion (3) ☐

We have a few other questions to ask which will provide us with information that will help us tabulate and analyze the data.

DO NOT ASK QUESTION 41

41. Sex:

Male (1) ☐ Female (2) ☐

42. How many children under 15 years of age live here?

CHECK ONE

0 (1) ☐ 1-3 (2) ☐ 4 or more (3) ☐

43. Do you have any pets?

CHECK AS MANY AS APPLY

a. Dogs .............................. ☐

b. Cats .............................. ☐

c. Birds .............................. ☐

d. Fish .............................. ☐

e. Other (Specify) ____________________

f. None .............................. ☐

44. Where did you live most of your life before you were 18? (READ RESPONSES)

On a farm or ranch, ........................................ (1) ☐
In the country but not on a farm, .......................... (2) ☐
In a town under 2,500, or .................................. (3) ☐
In a city? ................................................. (4) ☐

45. What is your occupation? We would like you to be specific.

TELEPHONE LINEMAN, RATHER THAN WORK FOR THE TELEPHONE COMPANY.

46. What is your age?

15-19 ...................................................... (1) ☐
20-29 ...................................................... (2) ☐
30-39 ...................................................... (3) ☐
40-49 ...................................................... (4) ☐
50-59 ...................................................... (5) ☐
60-69 ...................................................... (6) ☐
70 & over .................................................. (7) ☐

47. What is the highest grade in school you had an opportunity to complete? CHECK

| Elementary | | | High School | | College | | Beyond College |
|---|---|---|---|---|---|---|---|
| 1 - 4 years (1) | 5 - 6 years (2) | 7 - 8 years (3) | 1 - 3 years (4) | 4 years (5) | 1 - 3 years (6) | 4 years (7) | (8) |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

48. Have you had, in addition to the above, at least a school-year of training in business, nursing, or other technical specialty?

Yes (1) ☐ No (2) ☐

49. Have you purchased a fishing or hunting license during the last three years?

Yes (1) ☐ No (2) ☐

50. Now we would like to ask about some of the special interests you have. For each of the interests I name, will you tell me if you participate in it or have only general interest in it, or have no interest in it?

| | I participate (1) | General interest (2) | No interest (3) |
|---|---|---|---|
| a. Bird watching .... | ☐ | ☐ | ☐ |
| b. Boating .......... | ☐ | ☐ | ☐ |
| c. Camping .......... | ☐ | ☐ | ☐ |
| d. Collecting insects .......... | ☐ | ☐ | ☐ |
| e. Discussion groups .......... | ☐ | ☐ | ☐ |
| f. Fishing .......... | ☐ | ☐ | ☐ |
| g. Flower arranging ........ | ☐ | ☐ | ☐ |
| h. Golf .............. | ☐ | ☐ | ☐ |
| i. Hiking ........... | ☐ | ☐ | ☐ |
| j. Hunting .......... | ☐ | ☐ | ☐ |
| k. Nature study ...... | ☐ | ☐ | ☐ |
| l. Raising flowers............. | ☐ | ☐ | ☐ |
| m. Reading books .... | ☐ | ☐ | ☐ |
| n. Swimming ........ | ☐ | ☐ | ☐ |
| o. Vegetable gardening ........ | ☐ | ☐ | ☐ |

51. We need to know some of your interests and participation in certain organizations during the past 12 months. For each of the organizations named will you tell me: a. Were you a member? b. Did you usually attend meetings? c. Did you serve on any committees? d. Did you hold any offices?

| | CHECK IF YES | | | |
|---|---|---|---|---|
| | a. Member | b. Usually attended meetings | c. Served on committee | d. Held office |
| PTA ................ | ☐ | ☐ | ☐ | ☐ |
| Audubon ............ | ☐ | ☐ | ☐ | ☐ |
| Garden Club ........ | ☐ | ☐ | ☐ | ☐ |
| Rotary ............. | ☐ | ☐ | ☐ | ☐ |
| Kiwanis ............ | ☐ | ☐ | ☐ | ☐ |
| Lions .............. | ☐ | ☐ | ☐ | ☐ |
| Toastmasters ....... | ☐ | ☐ | ☐ | ☐ |
| A sportsman club (Specify) ________ | ☐ | ☐ | ☐ | ☐ |
| Home Demonstration Club .............. | ☐ | ☐ | ☐ | ☐ |
| AAUW ............... | ☐ | ☐ | ☐ | ☐ |
| League of Women Voters ............ | ☐ | ☐ | ☐ | ☐ |

54. What stations do you usually listen to? INSERT STATION CALL LETTERS

________________________________________

________________________________________

IF 53 c. (From 12-1 p.m.) WAS CHECKED, SKIP TO QUESTION 56a.

55. Do you ever listen to the radio between 12 noon and 1:00 p.m. on week-days?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 57.

IF YES, ASK QUESTION 56 and SKIP QUESTION 56 a.

56. How often?

| | QUESTION 56 | QUESTION 56a |
|---|---|---|
| Every day (4 to 5 times a week) ........................ | (1) ☐ | (1) ☐ |
| 2-3 times a week ........................ | (2) ☐ | (2) ☐ |
| Once a week to once every two weeks ........................ | (3) ☐ | (3) ☐ |
| Less than twice a month ........................ | (4) ☐ | (4) ☐ |

56a. How often do you listen between 12 noon and 1:00 p.m. on week-days? CHECK ABOVE.

57. During the last month or so, do you remember hearing anything on the radio about?

| | Yes (1) | No (2) | Don't remember (3) |
|---|---|---|---|
| Medicare? .................... | ☐ | ☐ | ☐ |
| Pesticides? .................. | ☐ | ☐ | ☐ |
| Vietnam? .................... | ☐ | ☐ | ☐ |
| Hungary? .................... | ☐ | ☐ | ☐ |
| Irish Rebellion? ............ | ☐ | ☐ | ☐ |
| Civil Rights? ............... | ☐ | ☐ | ☐ |

IF YES TO PESTICIDES, ASK:

57a. You said you heard something about pesticides in the past month or so. What were they talking about?

________________________________________________

________________________________________________

________________________________________________

58. Have you heard a radio program from V.P.I. (Va. Tech) in the past month or so?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

59. Do you have a working television?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 67.

60. When do you (RESPONDENT) usually watch TV? CHECK ONE OR MORE

a. 5-7 a.m. .................................... ☐
b. 7-10 a.m. .................................... ☐
c. 10-12 noon .................................... ☐
d. 12-4 p.m. .................................... ☐
e. 4-6 p.m. .................................... ☐
f. 6-8 p.m. .................................... ☐
g. after 8 p.m. .................................... ☐
h. Don't usually watch TV ........................ ☐
i. Don't ever watch TV ........................ ☐

IF DON'T USUALLY WATCH, SKIP TO QUESTION 62.

IF DON'T EVER WATCH, SKIP TO QUESTION 67.

61. What stations do you usually watch? INSERT CHANNEL NUMBERS

________________________________________________

62. Do you ever watch TV at 6:30 a.m. on week days?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 63.

IF YES,

62a. How often?

Every day (4 to 5 times a week) .................. (1) ☐

2-3 times a week ................................. (2) ☐

Once a week to once every two weeks .............. (3) ☐

Less than twice a month .......................... (4) ☐

63. During the past month or so do you remember having seen any programs on:

| | Yes (1) | No (2) | Don't remember (3) |
|---|---|---|---|
| a. Medicare? .......... | ☐ | ☐ | ☐ |
| b. Pesticides? .......... | ☐ | ☐ | ☐ |
| c. Vietnam? .......... | ☐ | ☐ | ☐ |
| d. Hungary? .......... | ☐ | ☐ | ☐ |
| e. Irish Rebellion? .... | ☐ | ☐ | ☐ |
| f. Civil rights? ........ | ☐ | ☐ | ☐ |

IF YES TO PESTICIDES, ASK:

64. What was the pesticide program about, if you remember?

________________________________________________

________________________________________________

65. Have you seen a program from V.P.I. in the past month or so?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES,

65a. What was it about?

66. Have you ever seen a spot announcement on TV with a cartoon character that looks like this?

SHOW CARD (K) WITH LARRY THE LABEL PICTURE

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES,

66a. What was or were the announcement(s) about?

66b. Do you happen to remember the character's name?

67. Do you get a daily newspaper?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 68.

IF YES, ASK:

67a. Which one (s) do you get?

67b. Do you usually look through the newspaper?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 68.

IF YES, ASK:

67c. How often is usually?

Every day (5-6 days) .............................. (1) ☐

2-4 times a week .................................. (2) ☐

Once a week to once
every two weeks ................................... (3) ☐

Less than twice a month ........................... (4) ☐

67d. Which sections do you usually read when you have time?

a. Front page news ................................ ☐

b. Sports ......................................... ☐

c. Society ........................................ ☐

d. Garden section ................................. ☐

e. Comics ......................................... ☐

f. "Dear Abby" .................................... ☐

g. State-local news ............................... ☐

h. Editorials ..................................... ☐

i. Columnists ..................................... ☐

j. Other (Specify) ________________________________

68. Do you get a Sunday paper?

Yes (1) ☐ No (2) ☐

IF NO SKIP TO QUESTION 69.

IF YES, ASK:

68a. Which ones do you get?

________________________________________

________________________________________

________________________________________

68b. Do you usually look through it?

Yes (1) ☐ No (2) ☐

IF NO SKIP TO QUESTION 69.

IF YES, ASK:

68c. How often is usually?

Every week .................................... (1) ☐
1-3 times a month ............................. (2) ☐
Less than once a month ........................ (3) ☐

68d. Which sections do you usually read when you have time?

a. Front page news ............................ ☐
b. Sports ..................................... ☐
c. Society .................................... ☐
d. Garden section ............................. ☐
e. Comics ..................................... ☐
f. "Dear Abby" ................................ ☐
g. State-local news ........................... ☐
h. Editorials ................................. ☐
i. Columnists ................................. ☐
j. Other (Specify) ____________________

69. Have you read any articles on pesticides in a newspaper during the past month or so?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES, ASK:

69a. What was it about?

____________________

____________________

____________________

HAND RESPONDENT PAMPHLET

70. Have you ever seen this pamphlet?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF NO OR DON'T REMEMBER - INTERVIEW ENDS

IF YES, ASK:

70a. Where did you see it?

________________________________________________________

________________________________________________________

70b. Have you read this pamphlet?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

70c. Do you have a copy of this pamphlet?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

70d. Have you ever told anyone else about this pamphlet, or shown it to anyone?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

70e. Have you discussed it with anyone?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

## Appendix B

# A COMPARATIVE STUDY OF USERS AND NON-USERS OF CHEMICAL PESTICIDES AMONG MIDDLE-CLASS URBAN WOMEN IN ROANOKE AND RICHMOND, VIRGINIA, BASED ON EDUCATIONAL ATTAINMENT AND OTHER SELECTED VARIABLES

by

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# CHAPTER I

# INTRODUCTION

## Background

The history of man has been one of his battle against the elements for food, clothing, and shelter. He has fought a constant battle against fire, cold, floods, droughts, insects, diseases, plagues, and pestilence in order to achieve today's high standard of living. Mechanization of the farm, the use of new crop varieties, and the application of fertilizers have led to highly productive agriculture. Concentration of a relatively few varieties of crops within an area, however, provided an ideal setting for the explosive growth of pests of all kinds.

Examples are cited from history of what happened when these pests were not kept under control. In 1845 and 1846 the late blight disease struck the potato crop in Ireland and brought starvation to three-fourths of a million Irish citizens. Grasshoppers caused such a great food shortage in the midwest that Congress declared it a national disaster in 1874. It took Florida citrus growers and others years to recover from the disastrous Medfly infestation of 1929. As recently as 1946, tomato blight cut eastern crops in half and many farmers stopped growing tomatoes.

Only 56 years ago were scientists able to identify the types of fleas that transmit the Bubonic Plague. It was not until the development and widespread use of modern insecticides that the disease has been brought under control. As late as the 1930's, more than 6 million people in the United States suffered each year from malaria. Since the discovery of DDT and other insecticides, the public health officials have an excellent weapon against the mosquitoes which transmit malaria. Thus the use of pesticides has a direct effect on the maintenance of human health.[1]

The increase in farm pesticide use during the past 15 years has been one of several factors contributing toward the low food prices in this country. Approximately 19 per cent of the income is spent for food in the United States. Figures from some other countries are considerably higher; Sweden, 27 per cent; Italy, 38 per cent; Japan, 42 per cent; Russia, 56 per cent.[2]

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[1] Dr. R. H. Gruenhagen, Extension Specialist, VPI, Blacksburg, Virginia, "The Necessity of Pesticides in Our American Way of Life." Unpublished paper, 1965.

[2] Wheeler McMillen, Bugs or People (New York: Appleton-Century, 1965), p. 210.

The report of the President's Science Advisory Committee stated that the use of pesticides must be continued if the present high standards of food and health are to be maintained. Officials of the United States Department of Agriculture estimated that unless the use of fertilizers and pesticides was continued, the cost to the consumer of inferior quality food products would double within five years.

It has become clear that proper usage is not simple and that while pesticides destroy harmful insects, plants, and plant diseases, they may also be toxic to beneficial plants and animals including man. The public should understand and appreciate the role of pesticides, chemicals, and drugs in the production of food and maintenance of a wholesome food supply. It is only through this understanding and appreciation that the public will be able to intelligently assess the problems associated with the use of pesticides, chemicals, and drugs.

One of the most important responsibilities of the Department of Agriculture is to develop, use, and recommend safe and effective methods for controlling the pests that threaten man and his environment. The Cooperative Extension Service is the informal educational arm of both the Department of Agriculture and the state land-grant colleges.

The major function of the Extension Service is education, the key to understanding basic information from research centers. Educational programs have been designed primarily for rural residents and contact with the urban dweller has been limited.

Studies have indicated that only a small percentage of suburban residents are aware of the Extension Service. Information released through mass communications, including radio and television, apparently has not reached large segments of the urban population.[3]

The general feeling of some Extension personnel has been that suburban information programs should be tailored to satisfy only the widespread needs, utilizing those channels which economically reach large sectors of the suburban population.[4]

Limited research has been conducted in order to identify segments of the middle-class urban audiences. Mrs. Esther Peterson, former Special Assistant to the President on Consumer Affairs, stated that it is the middle and upper-middle class income groups who demand and support legislation for consumers' protection.

---

[3] Verling C. Troldahl, "Communicating to the Suburbs," Journal of Cooperative Extension, II, No. 2 (Summer 1964), 82.

[4] Ibid.

Concern by various sections of the public about pesticide use caused the United States Congress to appropriate $26 million for expanded research on control of pests. Part of this appropriation--$2.1 million--was made available to the Extension Services and was allocated to the states according to the established Smith-Lever formula for the allocation of funds. This appropriation was announced to State Extension Directors by the Federal Extension Service Administrator in a letter dated August 26, 1964.[5]

State Extension Services have placed increased emphasis on training programs in pest and plant disease control. Most states have a full-time pesticide-chemicals program leader or coordinator.[6] The present staff of the VPI Chemical, Drug, and Pesticide Unit is composed of a coordinator, two specialists, and a secretary.

Virginia is one of three states currently conducting surveys with various audiences to determine their attitudes and knowledge relative to pesticide-chemicals. The comprehensive study being conducted by the Cooperative Extension Service at Virginia Polytechnic Institute,

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[5] Philip C. Minter, "Bench Marks in the Colorado State Agricultural Chemical Program" (Fort Collins, Colorado: Colorado State University, October 1965), p. 1.

[6] Harlan E. Smith and L. C. Gibbs, "States Increase Training Programs in Pests and Plant Disease Control," Extension Service Review (U.S. Department of Agriculture, Vol. 36, No. 4, April 1965), p. 4.

Blacksburg, Virginia, is "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides," Dr. R. H. Gruenhagen is the Project Leader. The research project is Budget Bureau No. 40-6673.

The objectives of the comprehensive study are as follows:

1. To design and perfect techniques to measure attitude toward and knowledge of pesticides and chemicals.
2. To determine the present knowledge of and current attitude of middle-class urban adults toward chemicals and pesticides.
3. To ascertain, by using the above techniques, the relative effect of various Extension methods used in a planned communication program in bringing about a change in attitude toward and knowledge of chemicals and pesticides on the part of middle-class urban adults.

The procedure involved getting information from a control group in Roanoke, Virginia, and an experimental group in Richmond, Virginia. Urban residents in both groups were interviewed before and after the communications program was put into effect. Random sampling methods for the selection of residents to be interviewed will be discussed under Methodology.

The data for the substudy which is the basis for this thesis were extracted from the pretreatment data of the comprehensive study. This substudy is limited to a comparison of the middle class urban women who were users and non-users of chemical pesticides based on age, background, educational attainment, special interests, and membership in certain organizations. This study also includes an analysis of middle class urban women's attitudes toward pesticides.

## Research Problem

It is difficult to design and implement meaningful Extension programs for the middle-class urban women because there is a lack of information concerning a profile of this group. It is likewise difficult to design and implement for this audience meaningful Extension programs on chemical pesticides because the attitude of the audience toward these materials is not known, nor is it known whether certain profile factors influence the use or non-use of chemical pesticides.

## Purpose of This Study

The purpose of this study is to supply profile and attitude information concerning the middle-class urban women which will be applicable in designing chemical pesticides programs as well as Extension programs in other areas.

## Objectives of This Study

The objectives of this study are as follows:

1. To determine the profile of middle class urban women for general use in program development and for specific use in designing programs in the area of chemical pesticides.
2. To determine if profile factors have any influence on whether the middle class urban women use or do not use pesticides.
3. To determine attitudes of middle class urban women relative to government controls and efficient uses of pesticides and compare the attitudes of users and non-users of pesticides.

## Scope of the Study

This study was confined to the women in the cities of Roanoke and Richmond, Virginia, who were interviewed in the control and experimental groups before the educational treatment. The comprehensive study is described on page 5.

## Identification of Terms

The terms used in this study are as follows:

1. Chemical pesticides in this study means chemicals that are used to kill pests such as insects, weeds, plant disease producing organisms, rodents.
2. Urban woman is a resident of an urbanized area of 75,000 population or more.
3. Middle-class refers to a resident in a middle and upper-middle income housing area who lives in an unattached, single-unit dwelling.
4. User is a woman who has used chemical pesticides.
5. Non-user is a woman who has never used chemical pesticides.
6. Attitude describes the thinking or feeling of a person which results in a stated preference.
7. Special interest activities refer to recreation, leisure-time pursuits, or hobbies.
8. Government protection refers to the laws which have been enacted for the protection of individuals and their surroundings.
9. Government controls are regulations of the sale and availability of pesticides.
10. Profile is an outline of characteristics of the urban woman including age, early residence, educational level, and involvement in special interest activities and organizations.

# CHAPTER II

## REVIEW OF LITERATURE

As the Cooperative Extension Services determine approaches and design educational programs for the urban audiences, it is important to identify audiences in terms of their physical surroundings, social structures, and socio-psychological characteristics.

The focus of this chapter is on research findings which have implication for the development of Extension programs for urban women.

The writer will briefly review the research which is in progress with various audiences in the field of chemical pesticides.

### Definition of Urban and Related Terms

The terms urban, suburban, urbanized area, urban fringe, and metropolitan are used in referring to a city and its residents. The dictionary defines urban as an area constituting or comprising a city or town; characteristic of a city as distinguished from the country.[1] The

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[1] Webster's New World Dictionary of the American Language, (New York: The World Publishing Company, 1966), p. 1602.

1960 U. S. Population Census[2] classifies population as urban if the town has 2,500 inhabitants or more.

_Suburban_ refers to residents living on the outskirts of a city, often a separately incorporated city or town. Characteristics of the suburbs or suburbanites include a combination of rural and urban features often referred to as middle class.[3]

According to the census, an _urbanized_ _area_ contains at least one city of 50,000 inhabitants or more as well as the surrounding closely settled incorporated places and unincorporated areas.[4]

_Metropolitan_ refers to the main city, often the capital, a center of population and culture. The census term is "Standard Metropolitan Statistical Areas" (SMSA) which includes a central city and surrounding areas to total at least 250,000 inhabitants. The urbanized area can be characterized as the physical city as distinguished from both the legal city and the metropolitan community.

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[2] U. S. Bureau of Census, _U. S. Census of Population: 1960, Vol. I, Characteristics of the Population_. Part A, Number of Inhabitants. U. S. Government Printing Office, Washington, D.C., 1961.

[3] _Op_. _cit_., Webster, p. 1455.

[4] _Op_. _cit_., U. S. Census, p. XV.

Urban fringe areas are unincorporated places of 2,500 residents which are classified as urban and within the urbanized or metropolitan area.

In Virginia over half of the approximately 4 million people are considered urban with 1,700,000 people living in six urbanized areas.[5] Roanoke and Richmond are two of these areas.

In 1960, 41 per cent of the population 25 years of age or older living in cities of under 10,000 had completed high school as compared with 45 per cent in the larger urbanized areas.[6] In Virginia, the median school years completed by the urban population is 11.5; however, over 51,000 of the state's urban women have completed four or more years of college.[7]

Manis[8] suggests that American families are on the move, Almost one-third of the urbanites were not living in the same house that they had lived in five years before. A study of the suburban dweller indicates that he does not take roots in his new locale even though he buys a house. The opportunity for advancement outweighs the unwillingness to move. Traditional ties and a sense of community belongingness are not major aspects of suburban life.

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[5] Op. cit., U. S. Census, Part 48, Virginia, Table 11, p. 21.

[6] Op. cit., U. S. Census of Population, 1960, Table 95.

[7] Op. cit., U. S. Census, Part 48, Virginia. Table 47, p. 151.

[8] Jerome G. Manis andLeo C. Stine, "Suburban Residence and Political Behavior," The Public Opinion Quarterly. Vol. XXII, Winter 1958-1959, pp. 488-489.

Within the metropolitan areas there is a special type of residence area known as the urban fringe. Research shows that most of the people are out-migrants. They come directly from the central city, not from the rural area. Even though either the husband or the wife usually has had some rural experience before moving to the open country area, their recent orientation has been to the activities of the city. It is not unusual to find a low level of social participation among the residents in the urban fringe.[9]

Tilly[10] reports that studies of American cities have shown that the grade of residence, that is cost of type of housing, generally rises with occupational rank. Occupation, education, and income affect grade of residence independently, but the effects of education and occupation are greater than those of income. Education has the strongest effect on the cost of residence among middle-class people.

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[9] Glen V. Fuguitt, The Rural-Urban Fringe. Reprint from 1962 Proceedings of American Country Life Association, Chicago, Illinois. p. 6.

[10] Charles Tilly, "Occupational Rank and Grade of Residence in a Metropolis," The American Journal of Sociology. Vol. 67, 1961, p. 323.

A major part of Extension home economics teaching is done through groups--those organized by Extension or existing organizations. The Gallup and Hill[11] survey found that of the 2,313 urban women interviewed, 48 per cent belonged to no organization. Church groups attracted the largest single grouping with 26 per cent; woman's clubs, 8 per cent; bridge clubs, 6 per cent; and youth groups, 5 per cent.

In contrasting residents of the inner cities with people living in outer areas, Brown[12] characterized the latter group as "high income and education, white collar occupations, nonpartisan in voting, and commuters. Women are active in organizations and raising families."

In a study conducted in eight urban areas, Boyle and Brown[13] concluded that the extent to which adaptations have been made by Cooperative Extension Services to serve urban clientele depended upon a number of factors. Important among them were (1) the skills, interests, and attitudes of the Extension staff, (2) extent to which resources are provided by local government, and (3) the knowledge, interests, and attitudes of the publics involved in assisting with the program.

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[11] George Gallup and Evan Hill, "The American Woman," The Saturday Evening Post, Vol. CCXXXV, No. 46 (December 22-29, 1962), p. 26.

[12] Emory J. Brown, "Extension and the Urban Environment," Journal of Cooperative Extension, Vol. III, No. 2, Summer 1965, p. 98.

[13] Patrick G. Boyle and Emory J. Brown, "Adapting 4-H to Urban Situations," Journal of Cooperative Extension, Vol. II, No. 1, (Spring 1964), pp. 35-36.

Brown[14] suggests that the following guidelines apply to Extension work in cities and densely populated areas:

1. An analysis should be made of social organizations in each urban area in order to delineate natural communities, organizations and agencies, communication channels, and key influentials.
2. The existing complex set of organizations and agencies provide ready access to large segments of the urban society. New organizational machinery will likely be necessary to reach those who are not participating in organizations.
3. The wide diversity of publics in urban areas necessitates a program with many facets if Extension is to contribute to solutions to problems peculiar to each type of public.

An effective Extension program starts where people are and should be flexible enough to provide for adjustments to changing situations. Therefore, it would seem that there is a definite need for bench-mark information concerning the urban audience in Virginia, particularly in audience identification and attitudes toward certain program areas.

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[14] *Op. cit.*, Emory J. Brown, p. 101.

As the result of expanded use of chemical pesticides in recent years, the Extension Service has been concerned with providing increased educational programs relevant to their proper use.

Philip C. Minter[15] has been instrumental in piloting research with the following groups: Wyoming Pesticides Dealers, veterinarians, licensed applicators, home gardeners, and farmers in Colorado.

His study[16] was designed to establish bench marks in three areas, namely:

1. Tables of relevant statistics concerning the use of agricultural chemicals in the state.
2. A report of all acts and regulations applying to agricultural chemicals within the state and statements concerning the constitution and functions of all formal committees.

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[15] Philip C. Minter, Agricultural Chemicals Coordinator, Colorado State University, Fort Collins, Colorado.

[16] _Op. cit._, Philip C. Minter.

3. A description of the informal working arrangements and liaison between all state and federal agencies and commercial organizations concerned with agricultural chemicals within the state.

There is a special research project being conducted at Iowa State University[17] in the area of attitudes and knowledge of various audiences concerning pesticide-chemical usage. The title of the overall study is "Factors Relating to Proper Use and Misuse of Pesticides." One of the four phases of the study has been completed, which is entitled "Behavior Studies Related to Pesticides-Agricultural Chemicals and Iowa Farmers." The other three phases are Rural Dealer Agricultural Chemical Phase, Urban Consumer-User Chemical Phase, and Urban Dealer Chemical Pesticide Phase.

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[17] Co-leaders of the research are Dr. George Beal, Professor of Rural Sociology, and Dr. Joe M. Bohlen, Professor of Rural Sociology, Iowa State University, Ames, Iowa.

# CHAPTER III

# METHODOLOGY

## Population

The comprehensive study (described on page 5) was designed to obtain information from residents in the middle and upper-middle income in the urbanized areas of Roanoke and Richmond, Virginia.

## Random Samples

The random sampling plan was designed by Dr. Charles E. Ramsey,[1] University of Minnesota, who served as one of the consultants for the study.

The random samples of urban residents were drawn within the following limitations:

1. Resided in a metropolitan area of 75,000 population or more.
2. Resided in a middle and upper-middle income housing area, which was determined by the housing evaluation level of the cities and by consultations with Extension agents.

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[1] Dr. Charles E. Ramsey, Professor, Research Methods, University of Minnesota, 1965. He also served as Chairman and Professor, Colorado State University, 1962-65, and is the author of fine books.

3. Lived in an unattached, single-unit dwelling.
4. Equal number of homemakers or male heads of households.

The samples consisted of 1,200 from Richmond which was the experimental group. Six hundred interviews were taken before the educational program and 600 after the program. In Roanoke, the control group, 400 samplings were made; 200 taken at the time Richmond was sampled the first time and 200 taken when Richmond was sampled post treatment.

## Sampling Methods

The U. S. Census of Housing publications of city blocks for Richmond[2] and Roanoke[3] and city maps were used to determine the sampling areas. The blocks were numbered consecutively within selected sections of each city. A book of random numbers was used to draw the sample.

Five houses were selected in each block, avoiding next-door neighbors. The following applicable criteria were used within the blocks:

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[2] U. S. Bureau of Census. U. S. Census of Housing: 1960. Vol. III, City Blocks. Series HC (3), No. 403. U. S. Government Printing Office, Washington, D.C., 1961.

[3] U. S. Bureau of Census. U. S. Census of Housing: 1960. Vol. III, City Blocks. Series HC (3), No. 404. U. S. Government Printing Office, Washington, D.C., 1961.

1. For a four-sided block, one corner house and one house from each side.
2. For a three-sided block, two houses each from the opposite sides (including one corner house from one of these sides) and one house from the odd side.
3. For a two-sided block, one corner house and two houses each from the two sides.

## Instrument of Observation

The instrument of observation was a personal interview schedule. With the assistance of Mrs. Laurel Sabrosky, Evaluation Consultant,[4] the schedule was designed to focus upon the following:

1. Attitude of middle and upper-middle class toward the role of pesticides.
2. Audience's knowledge of buying, using, and storing pesticides correctly and safely.
3. Audience's knowledge and attitude toward regulations and legislation concerning pesticides.
4. Audience's contact and exposure to Extension's chemical-pesticide communications program.

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[4] Mrs. Laurel Sabrosky, formerly Extension Research Specialist, Evaluation, Research, and Training, Federal Extension Service, United States Department of Agriculture.

5. Descriptive data that will be used to determine relationships that might exist within the above information.

The schedule consisted of 70 questions; however, the pretreatment interviews were limited to the first 51 questions. It is included in Appendix A.

The interview schedule was pretested by Dr. W. R. VanDresser and Dr. M. C. Heckel, original project leaders for the study. They pretested the schedule with professional associates, wives, and secretaries, all of whom were considered to be urban middle-class residents.

## Interviewing Procedure

The interviews were conducted by trained interviewers who were employed by Psychological Consultants, Inc., 1804 Staples Mill Road, Richmond, Virginia.

The survey which involved the pretreatment sample was conducted during July and August 1966 by 29 interviewers.

## Processing Answers

The data were coded for the 7040 and 1401 IBM computers at the Computing Center, Virginia Polytechnic Institute, Blacksburg, Virginia.

## Data for This Study

The data which were extracted from the comprehensive study and will be considered in this substudy were limited to the respondents in the pretreatment sample: 200 in Roanoke and 600 in Richmond. There were actually 799 respondents consisting of 402 women and 397 men. The sample for this study was composed of 402 women. Right schedules were deleted because the responses were incorrectly checked and could not be programmed on the computing cards. After the deletions, the total sample was 394 urban middle-class women.

## Statistical Analysis

Two members of the Statistics Department at Virginia Polytechnic Institute were consulted concerning statistical analysis. It was suggested that non-parametric techniques such as chi-square ($X^2$) and Mann Whitney U test be used. Percentage distribution and rank order were also used.

The chi-square formula[5] for testing agreement between observed and expected results is stated as follows:

$$X^2 = \sum \left[ \frac{(fo - fe)^2}{fe} \right]$$

---

[5] Henry E. Garrett, Statistics in Psychology and Education, (4th ed.; New York: Longmans, Green and Company, 1954), p. 254.

Chi square equals sum of frequency observed minus frequency expected, squared, divided by frequency expected.

Degree of freedom (df) were determined by the following formula: (row-1) (column-1).

Chi-square values were read along the appropriate row of a chi-square table.

# CHAPTER IV

# ANALYSIS OF DATA

As previously stated, the data for the comprehensive study were coded on cards at the Computing Center, Virginia Polytechnic Institute, Blacksburg, Virginia. The preliminary analysis of data for this study was obtained by using the IBM 083 sorter to select the respondents who were women. Then these data cards were separated on the basis of those who had used pesticides and those who had never used pesticides. Certain categories were set up to select data for comparison of users and non-users of pesticides.

This study consists of the analysis of data from 394 urban women who met certain criteria established for the population. The tabulation of this group showed that 305 (77.4 per cent) of the respondents were users and 89 (22.6 per cent) were non-users of chemical pesticides. For the purpose of this study, the groups are referred to as users and non-users.

## Age of Users and Non-Users of Pesticides

The interview schedule was set up to show the age groupings of the respondents. The data cards were sorted according to the seven age categories with the results shown in Table 1.

## TABLE I

## AGE PROFILE AND DISTRIBUTION ACCORDING TO USE AND NON-USE OF PESTICIDES

| Age Groupings | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| 15-19 years | 6 | 1.8 | 4 | 1.3 | 2 | 2.3 |
| 20-29 | 40 | 10.2 | 33 | 10.8 | 7 | 7.9 |
| 30-39 | 69 | 17.9 | 54 | 17.7 | 15 | 16.8 |
| 40-49 | 92 | 23.4 | 74 | 24.3 | 18 | 20.2 |
| 50-59 | 79 | 20.1 | 64 | 20.9 | 15 | 16.8 |
| 60-69 | 70 | 17.9 | 52 | 17.1 | 18 | 20.2 |
| 70 and over | 38 | 6.7 | 24 | 7.9 | 14 | 15.8 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |

$X^2 = 6.9469$ df 5

No significant difference at 0.05 level.

The chi-square test revealed there was no significant difference at the 0.05 level in the relationship of age as to whether the respondent was a user or non-user of pesticides.

The median age of the middle class urban women fell within the 40-49 years age range. Average age of users was 48 years and of non-users, 51 years.

## Impact of Place of Early Residence

The next consideration in drawing a profile of the urban women was to determine if the place of residence before they were 18 years of age had any effect on whether or not the respondent had used pesticides. The data in Table 2 show the distribution and percentage of the users and non-users in the four categories of place of early residence.

TABLE 2

PROFILE AND DISTRIBUTION OF USERS AND NON-USERS
BASED ON PLACE OF RESIDENCE
BEFORE 18 YEARS OF AGE

| Place of Residence Before 18 Years of Age | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Farm or ranch | 85 | 21.6 | 66 | 21.6 | 19 | 21.4 |
| Country, not on farm | 30 | 7.6 | 21 | 6.9 | 9 | 10.0 |
| Town under 2,500 | 56 | 14.2 | 44 | 14.4 | 12 | 13.5 |
| City | 223 | 56.6 | 174 | 57.1 | 49 | 55.1 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |

$X^2 = 0.9806$ df 3

No significant difference at 0.05 level.

The profile reveals that the largest number of middle class urban women spent their early years of residence in the city. The second largest group was those who had lived on a farm or ranch.

The chi-square test was used to show that the place of early residence was not a significant factor in determining the use or non-use of pesticides by the respondents.

## Educational Attainment of the Respondents

In designing an Extension education program, it is highly desirable to know the level of educational attainment represented by the audience for whom the program is being designed. One question in the interview schedule (see Appendix p. 85) was set up to provide information on the level of education attainment achieved by the sample of urban women being studied.

Although five categories were established in the original breakdown, an opportunity was provided for combining groups to make more realistic divisions to aid in program planning.

A preliminary examination of the data indicated that rather wide differences in educational attainment existed in the study sample. The raw data also suggested that differences in amount of formal education existed between the users and non-users.

An IBM 083 sorter was used to separate the users from the non-users in each of the five educational attainment groups.

The median educational level for the entire sample was compared to that for the users and non-users.

The median educational level of the sample was 12.4 years. The median school years completed by users was 12.9 years as compared to 11.4 years completed by non-users. The question then arose whether the differences in educational attainment levels were actually significant. The frequency data and calculated per cent values are summarized in Table 3.

TABLE 3

PROFILE AND DISTRIBUTION BASED ON THE EDUCATIONAL ATTAINMENT OF USERS AND NON-USERS

| Years of School Completed | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Elementary (1 through 8 years) | 38 | 9.7 | 20 | 6.6 | 18 | 19.8 |
| Some High School (1-3 years) | 47 | 11.9 | 34 | 11.1 | 13 | 14.7 |
| High School Graduate | 148 | 37.6 | 113 | 37.0 | 35 | 39.5 |
| Some College (1-3 years) | 72 | 18.2 | 60 | 19.7 | 12 | 13.6 |
| College Graduate or beyond bachelor's degree | 89 | 22.6 | 78 | 25.6 | 11 | 12.4 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |

$X^2 = 20.9904$ df 4

Highly significant at 0.01 level.

As indicated by the $X^2$ value for the data in the above table, there existed a highly significant difference in the level of educational attainment between users and non-users. The attainment categories were combined into high and low and the data are summarized in Table 4.

TABLE 4

DISTRIBUTION OF RESPONDENTS WITH HIGH AND LOW EDUCATIONAL LEVELS BASED ON USERS AND NON-USERS

| Educational Level | Group |  | Users |  | Non-Users |  |
|---|---|---|---|---|---|---|
|  | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| High educational level (High school graduate and beyond) | 309 | 78.4 | 251 | 82.3 | 58 | 65.2 |
| Low educational level (Elementary through 3 years high school) | 85 | 21.6 | 54 | 17.7 | 31 | 34.8 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |

$X^2 = 19.20$ df 1

Highly significant at 0.01 level.

The profile shows that more than three-fourths of the middle class urban women have completed high school or formal schooling beyond the high school level. There is a significant difference in the level of educational attainment of users and non-users. These data demonstrate that more of the respondents with a higher level of education use pesticides than those who have not completed high school.

## Membership in Selected Organizations

As previously indicated in this study, the Cooperative Extension Service programs reach many people through existing organizations. In the identification of the urban audiences, an important factor to be considered was that of membership in various organizations.

Almost 50 per cent of the 394 respondents held membership during the past year in at least one of the following organizations: parent-teacher association, garden club, League of Women Voters, Association of American University Women (AAUW), home demonstration club, and Audubon Society.

Table 5A shows the profile distribution and percentage of those who belonged to the selected organizations on the basis of being a user or non-user of pesticides.

The data in Table 5A indicate that more middle class urban women who were included in the sample held membership in parent-teacher associations than in all other organizations combined. Table 5B shows the respondents' relationship of educational level and membership in selected organizations.

## TABLE 5A

## PROFILE AND DISTRIBUTION OF USERS AND NON-USERS WHO WERE MEMBERS OF CERTAIN SELECTED ORGANIZATIONS

| Selected Organizations | Total Belonging | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| PTA | 123 | 31.2 | 100 | 32.8 | 23 | 26.8 |
| Garden Club | 32 | 8.1 | 24 | 8.8 | 5 | 5.5 |
| League of Women Voters | 11 | 2.8 | 10 | 3.3 | 1 | 0.3 |
| AAUW | 7 | 1.8 | 7 | 2.3 | 0 | 0 |
| Home Demonstration Club | 10 | 2.5 | 6 | 1.9 | 4 | 4.5 |
| Audubon Society | 2 | 0.5 | 2 | 0.7 | 0 | 0 |
| Total Members of above organizations | 185 | 46.9 | 152 | 49.8 | 33 | 37.1 |
| Total not members of above organizations | 209 | 53.1 | 153 | 50.2 | 56 | 62.9 |
| GRAND TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |

$X^2 = 4.0468$ df 1

Significant at 0.05 level

## TABLE 5B

## PROFILE AND DISTRIBUTION OF RESPONDENTS' MEMBERSHIP IN SELECTED ORGANIZATIONS ACCORDING TO EDUCATIONAL LEVEL

| Selected Organizations | Group | | High Educational Level (309) | | Low Educational Level (85) | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| PTA | 23 | 31.2 | 107 | 34.6 | 16 | 18.8 |
| Garden Club | 32 | 8.1 | 30 | 9.7 | 2 | 2.4 |
| League of Women Voters | 11 | 2.8 | 10 | 3.2 | 1 | 1.2 |
| AAUW | 7 | 1.8 | 7 | 2.3 | 0 | 0 |
| Home Demonstration Club | 10 | 2.5 | 7 | 2.3 | 3 | 3.5 |
| Audubon Society | 2 | 0.5 | 2 | 0.6 | 0 | 0 |
| Total members of above | 185 | 46.9 | 163 | 52.7 | 22 | 25.9 |
| Total not members of above | 209 | 53.1 | 146 | 47.3 | 63 | 74.1 |
| GRAND TOTAL | 394 | 100.0 | 309 | 100.0 | 85 | 100.0 |

$X^2 = 19.2$ df 1

Highly significant at 0.01 level.

## Participation in Selected Special Interest Activities

The profile of the middle class urban women was als based on their participation in selected special interest activities. The results of this investigation are summarized in Table 6.

TABLE 6

PROFILE AND DISTRIBUTION OF RESPONDENTS' PARTICIPATION IN SELECTED SPECIAL INTEREST ACTIVITIES BASED ON USE AND NON-USE OF PESTICIDES

| Activity | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Reading Books | 298 | 75.6 | 247 | 81.5 | 51 | 58.0 |
| Raising Flowers | 259 | 65.7 | 205 | 67.7 | 54 | 61.4 |
| Flower Arranging | 216 | 54.8 | 170 | 56.1 | 46 | 52.9 |
| Discussion Groups | 145 | 36.8 | 123 | 40.6 | 22 | 25.0 |
| Fishing | 105 | 26.7 | 85 | 28.1 | 20 | 22.8 |
| Vegetable Gardening | 102 | 25.9 | 84 | 27.7 | 18 | 20.5 |
| Hiking | 77 | 19.5 | 68 | 22.4 | 9 | 10.3 |
| Bird Watching | 68 | 17.3 | 58 | 19.1 | 10 | 11.1 |
| Nature Study | 59 | 14.9 | 55 | 18.2 | 4 | 4.5 |
| Camping | 58 | 14.7 | 46 | 15.2 | 12 | 13.6 |

NOTE: Percentages do not total 100 as respondents checked more than one choice.

The profile of the middle class urban women indicated that three-fourths of them read books and over one-half were engaged in raising and arranging flowers. The data also revealed that users of pesticides were more involved in selected special interest activities than were the non-users. In previously tabulated data, the users were respondents who had achieved a high educational level. This group showed a high degree of participation in reading books, whereas the non-users (low educational achievers) indicated more participation in raising flowers.

## Concerns of Middle Class Urban Women in Relation to Pollution of Surroundings

To round out the profile of the middle class urban women, they were asked if they were seriously concerned about the pollution of the air and streams. The data indicated that the users were somewhat more concerned than were the non-users.

TABLE 7

PROFILE AND DISTRIBUTION OF RESPONDENT'S CONCERN ABOUT POLLUTION OF THEIR SURROUNDINGS BASED ON USE OR NON-USE OF PESTICIDES

| Statement of Concern | Number in Group | Percentage of Responses | | |
|---|---|---|---|---|
| | | Yes | No | No Opinion |
| Pollution of air by smoke: | 393 | 78.1 | 19.3 | 2.6 |
| Users | 304 | 79.3 | 18.4 | 2.3 |
| Non-Users | 89 | 74.1 | 22.5 | 3.3 |
| Pollution of Virginia's rivers and streams: | 394 | 89.6 | 7.6 | 2.8 |
| Users | 305 | 92.1 | 5.9 | 2.0 |
| Non-Users | 89 | 80.9 | 13.5 | 5.6 |

## Profile of the Middle or Upper-Middle Class Woman

The following profile of the middle or upper-middle class urban woman was developed from the data in the sample of 394 respondents:

1. Median age was within the 40-49 year range.
2. The majority of women spent the first 18 years of their lives in a city.

3. The median educational level was 12.4 years of formal schooling completed.
4. Approximately one-half of the women were members of selected organizations.
5. Of the special interest activities, the majority of women read books, raised and arranged flowers.
6. Most of the women were concerned with pollution of the environmental surroundings.

## Attitudes of the Middle Class Urban Women Toward Government Controls, Effective Uses, and Harmful Effects of Pesticides

The profile which has been drawn for this segment of the urban women being studied indicated that the major differences between users and non-users of pesticides were educational attainment, participation in special interest activities, and membership in selected organizations. To further identify the audience, it was necessary to determine bench mark information concerning attitudes of the respondents.

Certain questions in the interview schedule were designed to measure attitudes related to government regulations and attitudes toward effective uses and harmful effects of pesticides. A numerical value was assigned to the responses to obtain the attitude score for each item. The scores of 10, 0, or 5 were assigned to various responses.

Responses to other questions were designed using Likert's International Scale[1] to express value to statements. Attitude was measured by checking one of six possibilities: strongly agree, agree, undecided, disagree, strongly disagree, no opinion. A value of 10, 8, 5, 2, 0, or 5 was assigned respectively to the above responses.

Attitudes of the respondents were analyzed on the basis of users and non-users. Previously analyzed data revealed that a high correlation existed between the users and high educational level groups. The same was true between the non-users and the low educational level groups.

## Attitudes Toward Government Controls

The middle class urban women were asked to respond to four questions or statements indicating how they felt toward the amount of present government protection and if the government should increase or decrease controls.

Data presented in Tables 8, 9, 10, and 11 show the profile of the respondents as well as the responses and attitude score averages for users and non-users.

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[1] *Op. cit.*, Garrett, p. 319.

## TABLE 8

## RESPONSE TO THE QUESTION, "DO YOU BELIEVE THE GOVERNMENT IS DOING ALL IT CAN TO ADEQUATELY PROTECT YOU FROM POSSIBLE POISONING FROM PESTICIDES?"

| Response | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| No | 74 | 18.8 | 59 | 19.4 | 15 | 16.9 |
| Yes | 211 | 53.5 | 159 | 52.1 | 52 | 58.4 |
| Don't Know | 109 | 27.7 | 87 | 28.5 | 22 | 24.7 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |
| Average Attitude Score | 3.4 | | 3.3 | | 2.9 | |

More than one-half of the middle class urban women indicated that they felt the government was doing all it could to protect them from possible poisoning from pesticides. About 25 per cent of the urban women indicated they did not know. The average scores indicate little difference between users and non-users in attitude toward government protection.

TABLE 9

RESPONSES PERTAINING TO CHANGE IN GOVERNMENT CONTROLS

| "The government should:" | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Put on lot more controls | 59 | 17.9 | 45 | 17.2 | 14 | 20.3 |
| Put on some more controls | 146 | 44.1 | 116 | 44.2 | 30 | 43.5 |
| Remove all controls | 3 | 0.9 | 0 | 0 | 3 | 4.3 |
| Remove some controls | 8 | 2.4 | 6 | 2.3 | 2 | 2.9 |
| Leave as are | 55 | 16.6 | 44 | 16.8 | 11 | 15.9 |
| Don't Know | 60 | 18.1 | 51 | 19.5 | 9 | 13.1 |
| TOTAL | 331 | 100.0 | 262 | 100.0 | 69 | 100.0 |
| Average Attitude Score | 6.6 | | 6.7 | | 6.5 | |

NOTE: Not all respondents answered this question.

The response "put on lot more controls" was indicated by 17.2 per cent of the users and 20.3 per cent of the non-users. The highest percentage of users and non-users wanted "some more controls."

TABLE 10

RESPONSE TO STATEMENT, "FARMERS SHOULD BE ALLOWED TO USE PESTICIDES AS THEY CHOOSE"

| Response to Statement | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Disagreed | 220 | 55.9 | 171 | 56.1 | 49 | 55.1 |
| Agreed | 104 | 26.4 | 82 | 26.9 | 22 | 24.7 |
| Undecided or Uninformed | 51 | 12.9 | 38 | 12.4 | 13 | 14.6 |
| No Opinion | 19 | 4.8 | 14 | 4.6 | 5 | 5.6 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |
| Average Attitude Score | 6.2 | | 6.0 | | 6.2 | |

Table 10 shows that over one-half of both users and non-users disagreed with the statement. There was very little difference in average attitude scores.

TABLE 11

RESPONSES TO THE QUESTION, "DO YOU THINK THAT CERTAIN PESTICIDES SHOULD BE AVAILABLE ONLY ON A PRESCRIPTION BASIS, LIKE MANY MEDICINAL DRUGS FOR PEOPLE?"

| Response | Group |  | Users |  | Non-Users |  |
|---|---|---|---|---|---|---|
|  | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Yes | 206 | 52.3 | 158 | 51.8 | 48 | 53.9 |
| No | 127 | 32.2 | 103 | 33.8 | 24 | 27.0 |
| Don't Know | 61 | 15.5 | 44 | 14.4 | 17 | 19.1 |
| TOTAL | 394 | 100.0 | 305 | 100.0 | 89 | 100.0 |
| Average Attitude Score | 5.98 |  | 5.9 |  | 5.4 |  |

The attitude score averages were close with the users having a slightly more favorable attitude toward an increase of government regulations.

A composite of statements regarding attitude toward government controls shows close correlation between users and non-users. The average attitude scores indicate a slightly more favorable attitude toward government regulations by users than by non-users.

## Attitudes of Users and Non-Users Toward the Effective Uses and Harmful Effects of Pesticides

People engaged in food production have realized the importance of continued use of chemical pesticides to maintain high quality of food. However, in recent years there has been information published indicating harmful effects from residues on food.

Since there is limited research available on the attitudes and understanding of urban women in the area of chemical pesticides, one of the purposes of this study was to develop bench-mark information. Certain questions in the schedule were directed toward the effective uses of pesticides, whereas others were aimed toward possible harmful effects.

### Attitude Toward Effects of Pesticides on Quality of Food

The respondents were asked to indicate the effect they thought the use of pesticides had on the quality of foods produced. Data presented in Table 12 show the distribution, percentages, and average attitude scores of the group in addition to an analysis of the users and non-users.

TABLE 12

RESPONSE TO THE QUESTION, "WHAT EFFECT DO YOU THINK THE USE OF PESTICIDES HAS ON THE QUALITY OF FOOD PRODUCED?"

| Responses | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Improve quality | 176 | 44.7 | 149 | 49.0 | 24 | 30.3 |
| No effect | 75 | 19.1 | 59 | 12.4 | 16 | 18.0 |
| Lowers quality | 44 | 11.2 | 30 | 9.9 | 14 | 15.7 |
| Improves some; lowers others | 14 | 3.6 | 11 | 3.6 | 3 | 3.4 |
| Don't know | 84 | 21.4 | 55 | 18.1 | 29 | 32.6 |
| TOTAL | 393 | 100.0 | 304 | 100.0 | 89 | 100.0 |
| Average Attitude Score | 6.8 | | 7.0 | | 5.8 | |

The data show that almost one-half of the users indicated that use of pesticides improved the quality of food. A significant number of the middle class urban women indicated they did not know. The average attitude score showed that the users have a more favorable attitude.

## Effects of Weed Killers on Food Production

The respondents were asked if they thought the use of weed killers by farmers helped to produce any of the following results: more food, cheaper food, better food, less food, more expensive food, food dangerous to eat, none of these, or don't know.

TABLE 13

RESPONSE TO QUESTION ON EFFECTS OF WEED KILLERS ON FOOD PRODUCTION

| Effects of Weed Killers | Group (394) | | Users (305) | | Non-Users (89) | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| More food | 215 | 54.6 | 182 | 59.6 | 33 | 37.0 |
| Better food | 163 | 41.4 | 134 | 43.9 | 29 | 32.5 |
| Cheaper food | 50 | 12.9 | 41 | 13.4 | 9 | 10.1 |
| More expensive food | 68 | 17.2 | 55 | 18.0 | 13 | 14.6 |
| Food dangerous to eat | 70 | 17.8 | 53 | 17.4 | 17 | 19.1 |
| Less food | 7 | 1.8 | 5 | 1.6 | 2 | 2.2 |
| None of these | 3 | 0.8 | 0 | 0 | 3 | 3.3 |
| Don't know | 76 | 19.3 | 52 | 17.0 | 24 | 26.9 |
| Average Attitude Score | 11.8 | | 12.6 | | 9.2 | |

NOTE: Percentages do not total 100, as respondents checked more than one item.

Table 13 indicates that the respondents had varying beliefs about the effects of weed killers. A higher percentage of the users checked more and better food, as was reflected in their more favorable attitude score.

## Attitude of Respondents Toward the Significant Effects of Pesticides

The respondents were asked to indicate what they thought were the most significant or important effects of pesticides. Non-users selected an average of 2.8 items whereas the users selected an average of 3.8 items. This might indicate that users were better informed and had broader information than the non-users.

A statistical analysis of Table 14, computed by Mann Whitney U Test, concluded there was insufficient evidence to show significant differences between the responses of users and non-users. However, there was a difference of 10.1 in the average attitude scores which indicates a more positive attitude on the part of the users.

Table 14 shows the rank order of significant effects and the average attitude score of users and non-users.

TABLE 14

NUMBER, PERCENTAGE, AND RANK ORDER OF THE MOST SIGNIFICANT EFFECTS OF PESTICIDES AS INDICATED BY USERS AND NON-USERS

| Significant Effects | Users (305) | | | Non-Users (89) | | |
|---|---|---|---|---|---|---|
| | Number Responding | Per Cent | Rank Order | Number Responding | Per Cent | Rank Order |
| Kill harmful bugs on food crops | 215 | 70.7 | 1 | 52 | 59.1 | 1 |
| Kill mosquitoes | 176 | 57.9 | 2 | 35 | 39.8 | 2 |
| Kill ants | 138 | 45.4 | 3 | 30 | 34.1 | 3 |
| Protect shrubs from disease | 128 | 42.1 | 4 | 23 | 26.1 | 5 |
| Protect apples from insects | 114 | 37.5 | 5 | 20 | 22.7 | 7 |
| Kill bugs on roses | 114 | 37.5 | 5 | 22 | 25.0 | 6 |
| Kill weeds in lawn | 109 | 35.9 | 6 | 24 | 27.3 | 4 |
| Harm children and pets | 45 | 17.1 | 7 | 18 | 20.5 | 8 |
| Harm people using them | 32 | 10.3 | 8 | 10 | 11.4 | 9 |
| Kill fish | 28 | 9.2 | 9 | 2 | 2.3 | 11 |
| Upset nature | 23 | 7.6 | 10 | 4 | 4.6 | 10 |
| Kill robins | 11 | 3.6 | 11 | 2 | 2.3 | 11 |
| Kill starlings | 8 | 2.6 | 12 | 1 | 1.1 | 12 |
| None is important | 3 | 1.0 | 13 | 2 | 2.3 | 11 |
| Total Responses | 1,145 | | | 245 | | |
| Average Attitude Score | | 30.6 | | | 20.5 | |

U = -2.795135

No significant difference in responses between users and non-users.

## Attitude Toward Certain Statements Concerning Pesticides and Their Use

In order to establish bench marks relevant to the urban dweller, it was necessary to find out how they feel and think about certain statements regarding pesticides and their use.

The respondents were asked to express how they felt in terms of strongly agree, agree, undecided, disagree, strongly disagree, or no opinion. Since the percentages for strongly agree and strongly disagree were small (less than 4 per cent), these categories were combined with agree and disagree. Data presented in Table 15 summarize the findings.

A high percentage of the users felt that in order to continue to produce an abundant supply of food, farmers must use pesticides. Both groups indicated that pesticides have done much to control the spread of pests. There was less agreement with the attitude statement that people would be healthier and happier if pesticides were not used. The users reflected a slightly more favorable attitude toward all of the statements.

TABLE 15

RESPONSES CONCERNING CERTAIN STATEMENTS ABOUT PESTICIDES

| Statement | Group | Average Attitude Score | Percentage of Respondents Who: Agreed | Dis-agreed | Unde-cided | No Opinion |
|---|---|---|---|---|---|---|
| In order to continue to produce an abundant supply of food, farmers must use pesticides. | User (305) | 7.7 | 84.0 | 5.2 | 8.9 | 1.9 |
| | Non-User (89) | 7.2 | 77.5 | 6.7 | 10.2 | 5.6 |
| There is little reason to fear pesticides. | User (305) | 4.8 | 39.0 | 42.9 | 14.8 | 3.3 |
| | Non-User (89) | 4.2 | 22.6 | 43.7 | 27.0 | 6.7 |
| If pesticides were not used, the American people might become short of food. | User (305) | 6.5 | 63.3 | 15.7 | 14.4 | 5.9 |
| | Non-User (89) | 6.1 | 48.4 | 14.6 | 30.3 | 6.7 |
| If pesticides were not used, people would be healthier and happier. | User (305) | 6.8 | 9.9 | 68.5 | 17.4 | 4.2 |
| | Non-User (89) | 5.6 | 22.5 | 41.6 | 30.3 | 5.6 |
| The use of pesticides has done little to control the spread of pests. | User (305) | 7.4 | 9.8 | 82.0 | 6.2 | 2.0 |
| | Non-User (89) | 6.6 | 15.7 | 64.1 | 15.7 | 4.5 |

## Attitude Toward the Ease of Controlling Pests with Pesticides

The respondents were asked if they felt that pesticides make it easy for a person to control insects and bugs, plant diseases, rats and mice, and weeds. Table 16 shows the percentage of responses and attitude score average for the group and on the basis of those who use and do not use pesticides.

The data show that the middle class urban women have a highly favorable attitude toward the ease of controlling pests with pesticides. About one-fourth of the non-users indicated they "did not know." Only a small percentage of the respondents had negative answers.

## Attitude Toward the Danger of Working with Pesticides

In an effort to obtain information about how middle class urban women felt about the danger of working with pesticides, the following question was asked, "In general, do you feel pesticides are pretty dangerous to work with?" The responses were not given a numerical value. The data were summarized in Table 17.

TABLE 16

RESPONSES TO THE STATEMENTS RELATIVE TO THE EASE OF CONTROLLING PESTS WITH PESTICIDES

| Pesticides make it easy for a person to control: | Group (394) | | | Users (305) | | | Non-Users (89) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | Don't Know | Yes | No | Don't Know | Yes | No | Don't Know |
| | | | | Per Cent | | | Per Cent | | |
| Insects and bugs | 92.1 | 2.6 | 5.4 | 96.4 | 3.3 | 0.3 | 76.2 | 1.1 | 22.7 |
| Plant diseases | 82.6 | 4.6 | 12.8 | 86.5 | 4.0 | 9.5 | 69.2 | 6.9 | 23.9 |
| Rats and Mice | 83.9 | 3.6 | 12.5 | 82.5 | 3.6 | 13.9 | 87.6 | 3.4 | 9.0 |
| Weeds | 78.6 | 4.6 | 16.8 | 81.6 | 4.3 | 14.1 | 67.7 | 6.2 | 26.1 |
| Average Attitude Score | 35.6 | | | 36.2 | | | 33.8 | | |

TABLE 17

RESPONSES TO THE QUESTION, "IN GENERAL, DO YOU FEEL PESTICIDES ARE PRETTY DANGEROUS TO WORK WITH?"

| Response | Group | | Users | | Non-Users | |
|---|---|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent | Number | Per Cent |
| Yes | 222 | 56.5 | 178 | 58.5 | 44 | 49.4 |
| No | 134 | 34.1 | 110 | 36.2 | 24 | 27.0 |
| No Opinion | 37 | 9.4 | 16 | 5.3 | 21 | 23.6 |
| TOTAL | 393 | 100.0 | 304 | 100.0 | 89 | 100.0 |

The data revealed that more than one-half of the respondents felt there was danger in working with pesticides. Of the non-users, a significant number indicated they had no opinion as to the danger.

# CHAPTER V

# SUMMARY, CONCLUSION, AND RECOMMENDATIONS

## Summary

The Cooperative Extension Service of Virginia Polytechnic Institute has as one of its responsibilities the designing and implementing of educational programs to insure that the people of the state have the latest information relative to chemical pesticides. Before such programs can be carried out effectively, the characteristics, attitudes, and educational needs of audience groups should be determined.

The objectives of this study were:

1. To determine the profile of middle class urban women for general use in program development and for specific use in designing programs in the area of chemical pesticides.
2. To determine if profile factors have any influence on whether the middle class urban women use or do not use pesticides.
3. To determine attitudes of middle class urban women relative to government controls and efficient uses of pesticides and compare the attitudes of users and non-users of pesticides.

The data for this study were extracted from the comprehensive study, "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides," Budget Bureau No. 40-6673, Dr. R. H. Gruenhagen, Project Leader. It is described on page 5.

Sampling and interviewing were done on a statistically established random plan developed by professional consultants.

The sample for consideration in this study was confined to 394 urban women in the cities of Roanoke and Richmond, Virginia. In order to establish a basis for comparative analyses, the respondents were divided according to users (305) and non-users (89) of chemical pesticides.

The statistical techniques used in the data analyses included frequency distribution, percentage, rank order, chi square test, and Mann Whitney U Test.

## Major Findings of This Study

Of the 394 Urban women, over three-fourths (77.4 per cent) were users of pesticides, whereas almost one-fourth (22.6 per cent) were non-users.

The ages of the respondents ranged from 15-19 years to over 70 years. The median age for users was 48 years and 51 years for non-users. There was no significant difference in the ages groups of users and non-users.

The place of early residence (before 18 years of age) had no significant influence as to whether the woman was a user or non-user of pesticides. A majority of middle class urban women spent the early years of residence in the city.

The median years of school completed by middle class urban women was 12.4. The users of pesticides had attained a significantly higher educational level than had the non-users. High and low education levels were used as variables and comparisons of certain data were made on that basis.

A higher percentage of the higher education group (users) were members of certain selected organizations, showed greater concern about environmental pollution, and were involved in more special interest activities.

Attitudes of the respondents were analyzed on the basis of users and non-users. A numerical value was assigned to the responses to obtain the attitude score average for each item.

More than one-half of the respondents felt that the government was providing adequate protection from possible poisoning by pesticides. The attitude score average showed little difference between users and non-users; however, the users had a slightly more favorable attitude than did the non-users. The users also indicated a slightly more favorable attitude toward an increase of government controls.

A majority of the middle class urban women had favorable attitudes toward these statements: by using pesticides, farmers are able to produce more food; the most significant effects of pesticides were to kill harmful bugs on food crops and to kill mosquitoes; in order to continue to produce an abundant food supply, it is necessary to use pesticides; the use of pesticides has done much to control the spread of pests.

The users had a more favorable attitude than did non-users toward the use of pesticides to improve the quality of food and that pesticides made it easy to control insects and bugs, rats and mice, plant diseases and weeds.

## Conclusions

The conclusions drawn from this study of middle class urban women aggregate information for use in designing Extension educational programs.

1. Approximately three of four middle class urban women had used chemical pesticides.
2. The median age for middle class urban women was within the 40-49 age range; however, the median age for users was 48 years and for non-users, 51 years. The users were slightly younger than non-users; however, age was not a determining

factor as to whether or not the urban woman was a user or non-user of pesticides.

3. The majority of the middle class urban women spent the first 18 years of their lives in the city. There was no significant difference between users and non-users in relation to the place of early residence.
4. The median educational level for the group was 12.4 years of formal schooling completed. The users had attained a higher educational level (12.9 years) than had the non-users (11.4 years).
5. Less than one-half of the middle class urban women were members of selected organizations. More of the users (49.8 per cent) were members of the selected organizations than were non-users (37.1 per cent).
6. Of the middle class urban women who were members of selected organizations, more than eight of ten had achieved an educational level of high school graduate or better.
7. Results of the study showed that three of four middle class urban women read books and a majority participated in raising and arranging flowers. A higher percentage of the users participated in all of the special interest activities than did the non-users.

8. Most of the middle class urban women were concerned with pollution of the environmental surroundings. The users were somewhat more concerned than the non-users.
9. In general, the middle class urban women had a favorable attitude toward improved quality of food as a result of using pesticides in food production.
10. The users had a more favorable attitude toward the significant uses of pesticides than did the non-users.
11. A higher percentage of the non-users were undecided, uninformed, and expressed no opinion in relation to their attitudes toward pesticides than were the users.

## Recommendations

Extension educational programs developed for middle class urban women must take into account that this audience is well educated and tends to participate in certain organizations and activities. These programs must be upgraded and made more sophisticated. Organization and special interest activity involvement will provide vehicles for implementing programs and should be taken into consideration in areas of program development.

Educational programs in chemical pesticides should be developed on two educational levels; namely, those directed to the audience with favorable attitudes should be designed for the better educated, whereas other programs should be developed on a lower educational level for those who have unfavorable to poor attitudes. These programs should emphasize the benefits of using pesticides.

Since approximately one-half of the middle class urban women do not belong to the selected organizations, other approaches should be used to reach target audiences with educational programs on chemical pesticides. However, a large percentage of this audience read books and probably use public library facilities which could be an outlet for Extension information.

The middle class urban women have indicated a variety of special interest activities upon which to focus programs in the subject matter area; for instance, those interested in camping would be concerned with suitable clothing and suggestions for food preparation.

## Recommendations for Further Study

Since this thesis was a substudy of the comprehensive study, described on page 5, the data is available for detailed analyses. The author recommends further substudies in order to compile empirical evidence concerning the middle and upper-middle class urban dweller.

1. A substudy to determine a profile of the middle class urban dweller, both men and women.
2. A descriptive study to determine the level of knowledge of the middle class urban dwellers concerning the proper use and storage of chemical pesticides.
3. An analysis of the patterns of the middle class urban dwellers regarding mass media communications habits.
4. An evaluative study of present Extension methods of using mass media communications to reach the middle class urban audience with specific information.

Beyond the comprehensive study, research should be directed toward the identification of segments of the urban audiences. In order to conduct effective Extension programs, "what urban women" or "what urban family" needs to be identified.

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# VITA

The author was born on April 10, 1924, in Abingdon, Virginia. She attended public schools in Washington County, Virginia, and graduated from Cleveland High School in 1941. She received a Bachelor of Science Degree in Home Economics and Science from Radford College, Radford, Virginia, in 1945.

From July 1 to September 30, 1945, she was employed by the Virginia Agricultural Extension Service as assistant home demonstration agent in Montgomery and Patrick Counties. She was appointed county home demonstration agent in Floyd County, Virginia, on October 1, 1945, and served until December 30, 1954.

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# APPENDIX

Budget Bureau No: 40-6673
Approval Expires: Dec. 31, 1966

Va. Coop. Extension Service

Virginia Polytechnic Institute Summer 1966

Address of respondent______________________________

Date of interview _______________ Interviewer's name____________

## CHEMICAL-PESTICIDE STUDY

I am representing the College of Agriculture of Virginia Polytechnic Institute which is making a study of the interests and needs of the people of Virginia in the use of pesticides on the farm, in the yard, and in the home.

When I say pesticides, I mean chemicals that are used to kill pests such as insects, weeds, plant diseases, rats, and mice.

*1. Have you, yourself, ever used any pesticide? Yes____No____

IF NO, SKIP TO INTRODUCTION TO QUESTION 3.

IF YES, ASK:

1a. To kill weeds? . . . . . . . . . . . . . . . . Yes____No____

1b. To kill insects inside the house? . . . . . . . Yes____No____

1c. To kill insects outside, on the lawn, in flowers, on vegetable garden? . . . . . . . Yes____No____

1d. To kill mice or rats? . . . . . . . . . . . . . Yes____No____

1e. To control plant diseases such as black spot on roses? . . . . . . . . . . . . . . . . Yes____No____

*Indicates questions analyzed in this study.

IF YES TO 1a. ASK:

2. How often would you say you use weed killer? CHECK ONE

Less than once a year . . . . . . . . . . . . . . . . . . . ._____

Once or twice a year . . . . . . . . . . . . . . . . . . . ._____

Once a month during the growing season . . . . . . . . ._____

More than once a month during growing season . . . . . ._____

IF YES TO 1c. ASK:

2a. How often would you say you use insect killers outside the house? CHECK ONE

Less than once a year . . . . . . . . . . . . . . . . . . . ._____

Once or twice a year . . . . . . . . . . . . . . . . . . . ._____

Once a month during the growing season . . . . . . . . ._____

More than once a month during growing season . . . . . ._____

As you perhaps know, farmers and public health workers use pesticides to control and destroy the weeds and insects that attack plants, animals, and people. Some people have expressed concern over the possible dangers of the use of such pesticides.

3. Have you ever seen this matter--possible dangers of the use of pesticides--discussed on television?

Yes___ No___ Don't remember___

4. Have you ever heard this matter discussed on the radio?

Yes___ No___ Don't remember___

5. Have you ever read about it in magazines or books?

Yes___ No___ Don't remember___

6. Have you ever discussed it with relatives or members of the family?

Yes___ No___ Don't remember___

7. Did your friends ever bring this subject up in a conversation?

Yes____ No____ Don't remember____

8. Have you ever attended a group meeting where such a concern was the topic of discussion?

Yes____ No____ Don't remember____

9. Are foods checked for the presence of pesticides before they are sold?

Yes____ No.____ Don't remember____

IF NO OR DON'T KNOW--SKIP TO QUESTION 10.

IF YES, ASK:

9a. You mean all foods? ____

Or some foods? ____

9b. Will you look at this card (A) and tell me who from this list does the checking?

CHECK ALL THAT APPLY.

1. Grower . . . . . . . ____
2. Federal government. . ____
3. The store . . . . . . ____
4. State government. . . ____
5. Wholesaler . . . _____
6. Other (Specify). _____
7. Don't know . . . _____

IF YES TO FEDERAL GOVERNMENT, ASK:

9c. Do you know which department or agency in the Federal Government is responsible for doing the checking?

Yes____ No____ Not Sure____

IF YES TO ABOVE, ASK:

9d. Which ones?

USDA____ HEW (FDA)_____ Other_____

IF YES TO STATE GOVERNMENT, ASK:

9e. Do you know which Department or agency in the State Government is responsible for doing the checking?

Yes____ No____ Not Sure____

IF YES TO ABOVE, ASK:

9f. Which ones?

Virginia Department of Agriculture ____ Others____

9g. Are there any Federal laws controlling the amount of pesticides that may be in food?

Yes____ No____ Not Sure____

IF YES TO ABOVE, ASK:

9h. What are the names of the laws?

______________________________________________

______________________________________________

______________________________________________

*10. Do you believe that the government is doing all it can to adequately protect you from possible poisoning by pesticides?

Yes____ No____ Not Sure_____

11. Will you look at this card (B) and tell me which of the items you believe to be correct?

Federal government control of pesticides includes:

a. Direct supervision of pesticide manufacturing and packaging plants. . . . . . . . . . . . . . . . . _____

b. Allowing sale only if pesticide can be used safely. . . . . . . . . . . . . . . . . . . . . . _____

c. Allowing sale only if pesticide does what the manufacturer says it will . . . . . . . . . . . _____

d. Permitting sale of the most poisonous pesticides only to farmers . . . . . . . . . . . . _____

e. Control of statements on pesticide label . . . . . _____

f. Setting retail prices of pesticides . . . . . . . . _____

g. Don't know . . . . . . . . . . . . . . . . . . . . _____

h. No control . . . . . . . . . . . . . . . . . . . . _____

IF g. OR h. IS CHECKED, SKIP TO QUESTION 13.

*12. Will you look at this card (C) and tell me which of these things the Government should do? CHECK ONLY ONE.

Remove all controls on the use of pesticides . . . . . _____

Remove some controls on the use of pesticides . . . . . _____

Leave all controls as they are . . . . . . . . . . . . _____

Put some more controls on the use of pesticides . . . . _____

Put a lot more control on the use of pesticides . . . . _____

Don't know . . . . . . . . . . . . . . . . . . . . . . _____

13. Do manufacturers warn users when their pesticide is poisonous?

Yes_____ No_____ Don't Know_____

IF YES, ASK:

13a. When they do warn users, how do they do it?

On the label_____ Other_____ Don't know_____

IF THE RESPONDENT ANSWERED NO TO QUESTION 1 ON PAGE 1 (NEVER USED ANY PESTICIDES) NOW SKIP TO QUESTION 25.

14. When you use a pesticide which you have used before, do you read the label, or do you remember how to use it without reading it again?

Read_____ Remember how_____ Other_____

15. Are there any particular directions on labels you can't understand or follow?

Yes_____ No____ Don't Remember____

IF YES, ASK:

15a. Can you tell me what some of them are?

______________________________________________

______________________________________________

______________________________________________

16. Do you happen to know what word is used to describe the amount of pesticide allowable by law in food or food products?

Tolerance_____ Other answer_____ Don't know_____

17. Where do you keep pesticides when you are not using them?

CHECK AS MANY AS APPLY.

a. In the garage . . . . _____ d. In the basement____

b. In a garden tool shed. _____ e. Other (Specify)

c. In the kitchen . . . . _____ ________________

18. Would you say that all, most, some, or noneare stored out of reach of children or pets?

All____ Most____ Some____ None____

19. Are all, most, some, or none stored under lock and key?

All____ Most_____ Some____ None____

20. Have you ever used aerosol bombs containing pesticides?

Yes____ No_____

IF NO, SKIP TO QUESTION 21.

IF YES, ASK:

20a. What do you do with them when they are empty?

a. Throw in trash pick-up . . . . . . . . ____

b. Burn . . . . . . . . . . . . . . . . . ____

c. Throw away . . . . . . . . . . . . . . ____

d. Bury . . . . . . . . . . . . . . . . . ____

e. Other (Specify) . . . . . . . . . . . ____

21. What do you do with empty containers of pesticides other than aerosol bombs? CHECK AS MANY AS APPLY.

a. Burn, if paper bag . . . . . . . . . ____

b. Throw in trash pick-up . . . . . . . ____

c. Bury . . . . . . . . . . . . . . . . . ____

d. If bottles, wash and use for storage of other liquids . . . . . . . ____

e. Other (Specify) . . . . . . . . . . . ____

f. Don't use . . . . . . . . . . . . . . ____

22. What do you do with left-over pesticide spray materials? CHECK AS MANY AS APPLY.

a. Dump on ground . . . . . . . . . . . . ____

b. Leave in sprayer for next time . . . . ____

c. Pour down drain . . . . . . . . . . . ____

d. Keep in a container, but not in sprayer____

e. Don't have any left over--make just what is needed . . . . . . . . . . . . ____

f. Other (Specify)______________________________

g. Have never used a pesticide in a sprayer____

23. Will you look at this card (D) and tell me which of these ways help you decide which pesticide to buy? CHECK AS MANY AS APPLY.

a. Advertisement:

  (a) In newspaper . . . . . . . . . . . . . . . . . ____

  (b) On TV . . . . . . . . . . . . . . . . . . . . ____

  (c) On radio . . . . . . . . . . . . . . . . . . . ____

  (d) In magazine . . . . . . . . . . . . . . . . . ____

b. Ask a friend . . . . . . . . . . . . . . . . . . . ____

c. Ask the Extension agent (county agent) . . . . . ____

d. Ask the storekeeper or clerk . . . . . . . . . . ____

e. Ask a nurseryman . . . . . . . . . . . . . . . . ____

f. Ask VPI (Virginia Tech) . . . . . . . . . . . . . ____

g. Ask the State Department of Agriculture . . . . ____

h. Look through the various pesticides on the shelf at the store . . . . . . . . . . . . . ____

i. Read about the correct pesticide in a book, magazine, or recommendation sheet . . . . ____

j. Use the one I have used for years . . . . . . . ____

k. Family member told me what to buy . . . . . . . ____

l. Other (Specify) . . . . . . . . . . . . . . . . . ____

m. I don't buy them . . . . . . . . . . . . . . . . ____

24. Will you look at this card (E) and tell me which of these methods you use to find out how to use a pesticide? CHECK AS MANY AS APPLY.

a. Ask a friend . . . . . . . . . . . . . . . . . . ____

b. Recall what I have read about it . . . . . . . . ____

c. Read the instructions printed on the package . . ____

d. Ask the person who sold it to me . . . . . . . . . . . ____

e. Ask the county agent . . . . . . . . . . . . . . . . . ____

f. Ask a nurseryman . . . . . . . . . . . . . . . . . . . ____

g. Look in bulletin or article I have seen about a pesticide . . . . . . . . . . . . . . . . . . . . ____

h. Ask a family member . . . . . . . . . . . . . . . . . ____

i. Other (Specify) . . . . . . . . . . . . . . . . . . . ____

25. I have some books listed here. As I name each one, will you tell me whether you have heard of it, whether you have read it, and whether it discusses pesticides?

| | Heard of? | Read? | Discusses Pesticides? |
|---|---|---|---|
| a. DEERSLAYER by James Fenimore Cooper | Yes____<br>No ____ | Yes____<br>No ____ | Yes____<br>No____<br>DK____ |
| b. SILENT SPRING by Rachel Carson | Yes____<br>No ____ | Yes____<br>No ____ | Yes____<br>No ____<br>DK ____ |
| c. TO KILL A MOKINGBIRD by Harper Lee | Yes____<br>No ____ | Yes___<br>No ___ | Yes____<br>No ____<br>DK ____ |
| d. BUGS OR PEOPLE? by Wheeler McMillen | Yes____<br>No ____ | Yes___<br>No ___ | Yes____<br>No ____<br>DK ____ |

*26. What effect do you think the use of pesticides has on the quality of foods produced: Improves quality, lowers quality, or has no effect?

Improves quality . . . . . . . . . ____

No effect . . . . . . . . . . . . ____

Lowers quality . . . . . . . . . . ____

Improves some, lowers others . . ____

Don't know . . . . . . . . . . . . ____

27. I have a short list of items here. As I read each one, will you tell me whether you think it is one of the results of the use of pesticides?

| | Yes | No | Don't Know |
|---|---|---|---|
| a. Control of malarial mosquitoes . | ___ | ___ | _____ |
| b. Reduction of amount of sleeping sickness (equine encephalitis) . | ___ | ___ | _____ |
| c. Reduction of the number of fish in some places or areas . . | ___ | ___ | _____ |
| d. Control of fleas and flies that carry disease . . . . . . . | ___ | ___ | _____ |
| e. Reduction in the number of birds . . . . . . . . . . . . . . | ___ | ___ | _____ |

*28. Will you look at all the items on this card (F), and then tell me which you think are the most significant or important effects of pesticides?

DO NOT CHECK ALL--CHECK ONLY MOST IMPORTANT

a. Kill ants . . . . . . . . . . . . . . ____

b. Protect apples from insects . . . . ____

c. Kill harmful bugs on food crops . . ____

d. Kill bugs on roses . . . . . . . . . ____

e. Harm children and pets . . . . . . . . . . . . ____

f. Kill fish . . . . . . . . . . . . . . . . . . ____

g. Kill mosquitoes . . . . . . . . . . . . . . . ____

h. Upset nature . . . . . . . . . . . . . . . . ____

i. Harm people using them . . . . . . . . . . . . ____

j. Kill robins. . . . . . . . . . . . . . . . . . ____

k. Protect shrubs from disease . . . . . . . . . ____

l. Kill starlings . . . . . . . . . . . . . . . . ____

m. Kill weeds in lawn . . . . . . . . . . . . . . ____

n. None is important . . . . . . . . . . . . . . ____

*29. Will you look at this card (G) and tell me whether you think the use of weed killers by farmers helps produce any of the listed results?

CHECK AS MANY AS APPLY.

a. More food . . . . . ____

b. Less food . . . . . ____

c. More expensive food. ____

d. Cheaper food . . . . ____

e. Better food. . . ____

f. Food dangerous to eat . . . . ____

g. None of these . ____

h. Don't know . .. ____

*30. In general, do you feel pesticides make it easy for a person:

| | Yes | No | DK |
|---|---|---|---|
| a. To control insects or bugs?. . . | ___ | ___ | ___ |
| b. To control weeds? . . . . . . . . | ___ | ___ | ___ |
| c. To control plant diseases? . . . | ___ | ___ | ___ |
| d. To control rats and mice? . . . . | ___ | ___ | ___ |

31. Will you look at this card (H)? Do you believe any of these people are in any danger from the use of pesticides? CHECK AS MANY AS APPLY.

| | QUESTION 31 | QUESTION 31a |
|---|---|---|
| a. The people who make the pesticides . . . . . | ___ | ___ |
| b. Applicators (farmers or commercial persons who put the pesticides on) . | ___ | ___ |
| c. Harvesters of food . . . | ___ | ___ |
| d. Retail dealers (handlers, salesmen, warehousemen). | ___ | ___ |
| e. Consumers who eat food treated with pesticides. | ___ | ___ |
| f. None is in danger . . . | ___ | ___ |

IF MORE THAN ONE WAS CHECKED FOR 31, ASK:

31a. Which one do you believe was exposed to the greatest risk? CHECK ABOVE.

IF b. for 31 (APPLICATORS) WAS NOT CHECKED--SKIP TO QUESTION 33.

32. If a farmer carefully follows the manufacturer's directions for use of pesticides, do you feel there is any danger to him?

Yes___ No___ Don't Know___

IF YES,

32a. Would you say a great deal, some, or a very little?

A great deal___ Some___ Very little___

33. What do you usually do before eating a raw apple or pear? CHECK ONLY ONE.

Peel it. . . . . . . . . ___
Wash it or rinse it . ___
Wipe it off . . . . . . ___
Nothing . . . . . . . . ___ SKIP TO QUESTION 34.

33a. Why do you do it?

________________________________________

________________________________________

34. Do you think in Richmond/Roanoke there are fewer birds than there used to be, more birds, or about the same number as always?

Fewer birds than there used to be ___

More birds than there used to be ___

About the same number as always ___

Don't know ___

IF FEWER, ASK:

34a. Why do you think there are fewer?

________________________________________

________________________________________

35. Do you feel that pesticide sprays and dusts endanger wildlife that may come in contact with them?

Yes____ No____ Don't know____

IF YES,

35a. Would you say: A great deal, some, very little, or none?

A great deal____ Some____ Very little_____

*36. I am going to read a number of statements which one might hear concerning pesticides or their use. For each one, as I read it, will you indicate whether you Strongly Agree (SA) with the statement, Agree (A), are Undecided (U), Disagree with it (D), or strongly Disagree (SD). These responses are listed on this card. HAND RESPONDENT CARD (I).

Please consider each statement by itself and in its entirety when expressing your opinion.

*a. In order to continue to produce an abundant supply of food, farmers must use pesticides.

SA___ A___ U___ D___ SD___ No Opinion___

*b. If pesticides were not used, people would be healthier and happier.

SA___ A___ U___ D___ SD___ No Opinion___

*c. The use of pesticides has done little to control the spread of pests.

SA___ A___ U___ D___ SD___ No Opinion___

*d. There is little reason to fear pesticides.

SA___ A___ U___ D___ SD___ No Opinion___

e. If pesticides are used properly, people can avoid any harm from them.

SA___ A___ U___ D___ SD___ No Opinion___

*f. Farmers should be allowed to use pesticides as they choose.

SA___ A___ U___ D___ SD___ No Opinion___

*g. If pesticides were not used, the American people might become short of food.

SA___ A___ U___ D___ SD___ No Opinion___

h. There have been deaths due to poor handling of pesticides.

SA___ A___ U___ D___ SD___ No Opinion___

i. Pesticides should not be put in unlabeled bottles or bags.

SA___ A___ U___ D___ SD___ No Opinion___

*37, In general, do you feel pesticides are pretty dangerous to work with?

Yes____ No____ No Opinion____

*38. Do you think that certain pesticides should be available only on a prescription basis, like many medicinal drugs for people?

Yes____ No____ No Opinion____

39. I would like to ask you how much concerned you think various people or groups are about the possible harmful effects from the use of pesticides.

Here is a card (J) with a listing of degrees of concern that I would like you to use in answering my questions. HAND CARD TO RESPONDENT AND READ CARD.

| | Not concerned about the effects | A little concerned | Quite concerned | Very much concerned | Don't know |
|---|---|---|---|---|---|
| First of all how concerned are you? | ___ | ___ | ___ | ___ | ___ |
| How concerned are: | | | | | |
| The general public . . . . . | ___ | ___ | ___ | ___ | ___ |
| Chemical Manufacturers. . | ___ | ___ | ___ | ___ | ___ |
| Congress . . . . | ___ | ___ | ___ | ___ | ___ |
| Food and Drug Administration . | ___ | ___ | ___ | ___ | ___ |

39. (Cont.)

| | Not concerned about the effects | A little concerned | Quite concerned | Very Much Concerned | Don't know |
|---|---|---|---|---|---|
| U. S. Dept. of Agriculture. . . | ___ | ___ | ___ | ___ | ___ |
| Va. Dept. of Agriculture. . . | ___ | ___ | ___ | ___ | ___ |
| State legislators . . | ___ | ___ | ___ | ___ | ___ |
| VPI (Va. Tech) . | ___ | ___ | ___ | ___ | ___ |
| Extension agents . . . . . | ___ | ___ | ___ | ___ | ___ |

*40. Are the following of serious concern to you?

| | Yes | No | No opinion |
|---|---|---|---|
| *a. Pollution of the air by smoke . . . . . . . . . | ___ | ___ | ___ |
| b. Foreign relations . . . . | ___ | ___ | ___ |
| c. Contamination from radioactive fallout . . . | ___ | ___ | ___ |
| d. Inflation . . . . . . . . .. | ___ | ___ | ___ |
| *e. Pollution of Virginia rivers and streams . . . | ___ | ___ | ___ |

We have a few other questions to ask which will provide us with information that will help us tabulate and analyze the data.

*41. Sex: Male___ Female___

42. How many children under 15 years of age live here? CHECK ONE.

0____ 1-3___ 4 or more____

43. Do you have any pets? CHECK AS MANY AS APPLY.

a. Dogs . . . . . . . . . . ___

b. Cats . . . . . . . . . . ___

c. Birds . . . . . . . . . ___

d. Fish . . . . . . . . . . ___

e. Other (Specify). . . . . ___

f. None . . . . . . . . . . ___

*44. Where did you live most of your life before you were 18? (READ RESPONSES.)

On a farm or ranch . . . . . . . . . . . . ___

In a town under 2,500. . . . . . . . . . . ___

In the country but not on a farm . . . . ___

In a city? . . . . . . . . . . . . . . . ___

45. What is your occupation? We would like you to be specific. TELEPHONE LINEMAN, RATHER THAN WORK FOR THE TELEPHONE COMPANY.

______________________________________________

______________________________________________

*46. What is your age?

15-19 . . . . ___

20-29 . . . . ___

30-39 . . . . ___

40-49 . . . . ___

50-59 . . . . ___

60-69 . . . . ___

70 and over . ___

*47. What is the highest grade in school you had an opportunity to complete? CHECK.

| Elementary | High School | College | Beyond College |
|---|---|---|---|
| 1-4 years___ | 1-3 years ___ | 1-3 years___ | ___ |
| 5-6 years___ | 4 years ___ | 4 years ___ | |
| 7-8 years___ | | | |

48. Have you had, in addition to the above, at least a school-year of training in business, nursing, or other technical specialty?

Yes____ No___

49. Have you purchased a fishing or hunting license during the last three years?

Yes____ No___

50. Now we would like to ask about some of the special interests you have. For each of the interests I name, will you tell me if you participate in it or have only general interest in it, or have no interest in it?

| | I Participate | General Interest | No Interest |
|---|---|---|---|
| a. Bird watching . . . . | ___ | ___ | ___ |
| b. Boating . . . . . . . . | ___ | ___ | ___ |
| c. Camping . . . . . . . . | ___ | ___ | ___ |
| d. Collecting insects. . | ___ | ___ | ___ |
| e. Discussion groups . . | ___ | ___ | ___ |
| f. Fishing . . . . . . . . | ___ | ___ | ___ |
| g. Flower arranging. . . | ___ | ___ | ___ |
| h. Golf. . . . . . . . . . | ___ | ___ | ___ |
| i. Hiking. . . . . . . . . | ___ | ___ | ___ |
| j. Hunting . . . . . . . | ___ | ___ | ___ |
| k. Nature study. . . . . | ___ | ___ | ___ |
| l. Raising flowers . . . | ___ | ___ | ___ |
| m. Reading books . . . . | ___ | ___ | ___ |
| n. Swimming. . . . . . . | ___ | ___ | ___ |
| o. Vegetable gardening . | ___ | ___ | ___ |

*51. We need to know some of your interests and participation in certain organizations during the past 12 months. For each of the organizations named will you tell me: a. Were you a member? b. Did you usually attend meetings? c. Did you serve on any committees? d. Did you hold any offices?

| | CHECK IF YES | | | |
|---|---|---|---|---|
| | a. Member | b. Usually attended meetings | c. Served on committee | d. Held office |
| PTA | ___ | ___ | ___ | ___ |
| Audubon | ___ | ___ | ___ | ___ |
| Garden Club | ___ | ___ | ___ | ___ |
| Rotary | ___ | ___ | ___ | ___ |
| Kiwanis | ___ | ___ | ___ | ___ |
| Lions | ___ | ___ | ___ | ___ |
| Toastmasters | ___ | ___ | ___ | ___ |
| A sportsman club (Specify__________) | ___ | ___ | ___ | ___ |
| Home Demonstration Club | ___ | ___ | ___ | ___ |
| AAUW | ___ | ___ | ___ | ___ |
| League of Women Voters | ___ | ___ | ___ | ___ |

NOTE: Remaining questions were omitted because data were not used in this substudy.

# A COMPARATIVE STUDY OF USERS AND NON-USERS OF CHEMICAL PESTICIDES AMONG MIDDLE CLASS URBAN WOMEN IN ROANOKE AND RICHMOND, VIRGINIA, BASED ON EDUCATIONAL ATTAINMENT AND OTHER SELECTED VARIABLES

BY

Frances Hilt Graham

## ABSTRACT

The purpose of this study was to supply profile and attitude information concerning the middle class urban women which would be applicable in designing Extension educational programs in chemical pesticides as well as Extension programs in other areas.

The data for analysis were extracted from the comprehensive study, "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides," Budget Bureau No. 40-6673, Dr. R. H. Gruenhagen, Project Leader.

The sample for consideration in the study for this thesis was confined to 394 middle class urban women in the cities of Roanoke and Richmond, Virginia. The comparative analysis was on the basis of users and non-users of chemical pesticides. The statistical techniques included frequency distribution, percentage, rank order, chi square test, and Mann Whitney U Test.

Of the 394 middle class urban women, over three-fourths (77.4 per cent) had used pesticides and almost one-fourth (22.6 per cent) were non-users.

Appendix C

# A STUDY OF THE KNOWLEDGE AND ATTITUDES OF THE MIDDLE AND UPPER-MIDDLE INCOME CLASS URBAN DWELLER TOWARD CHEMICAL PESTICIDES

by

Madge Morgan Bush

Thesis submitted to the Graduate Faculty of the

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in candidacy for the degree of

MASTER OF SCIENCE

in

EXTENSION EDUCATION

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# CHAPTER I

# INTRODUCTION

## Background

The American consumer has a bountiful food supply and enjoys the highest standard of living in the world.(6) This affluence is largely due to development of industrial technology, which includes the industry of agriculture. In less than 50 years, modern technology has enabled the American farmer to endow this nation with a surplus level of agricultural produce over a subsistence level of former decades.(83) On the average, the present-day farmer provides sufficient food to feed himself and forty additional individuals.(40) Mechanization, improvement in fertilizers, hybridization of productive and disease-resistant plants and selective breeding of animals to a degree have contributed to man's present high standard of living. However, a less familiar technological development, the use of chemical pesticides, has contributed directly to this nation's bountiful food supply.

The American consumer works fewer hours for more and better quality food than consumers in any foreign nation.(6) On the average, the United States consumer of 1968 spends approximately 18 per cent of his or her disposable income for food. Other nations of the world do not enjoy a similar situation. In Sweden, the consumer spends about 27 per cent of his income for food; in Italy, about 38 per cent; and in Russia, about 56 per cent.(6)

Generally speaking, the nutritional status of the present-day American consumer is good.(6) The nutrient level per person per day averaged 3200 calories in 1966.(6) This level exceeds by 20 per cent the United States caloric standard, namely the amount of calories necessary to sustain an individual.

This abundance of food and increased nutritional level has resulted in a generally high standard of health. Part of this high standard of health has been attained through development and proper use of safe and efficient pesticides.(6) Malaria, yellow fever, schistosmiasis, plague and rickettsia, are characteristic examples of diseases which have been controlled or prevented in North America by controlling the vector through the wise application of pesticides.(17)

Awareness of the many uses of chemical pesticides has demanded further development of more types of these materials and created a need for volume production. Since DDT became available in 1945 for control of insects, almost 500 new compounds have been incorporated into 54,000 registered formulae by 1962.(48) These chemical pesticides are classified on the basis of their safe handling. Approximately 73 per cent of the pesticides produced are used in agriculture, industry and government, 27 per cent is used for urban uses such as lawns, gardens, and households.(4)

The need for chemical pesticides is apparent. Their use has resulted in a wide offering of choice fruits and vegetables, meats and dairy products to the American consumer.(17) Fruits and vegetables are essentially unmarred and blemish-free; meats and dairy products are well-preserved and insect-free. All of this comes to the consumer at a much reduced cost. The Council of Economic Advisors Report to the

President, 1966, (26) estimated that consumers spend approximately $106.7 billion annually at the grocery checkout counter for food, or $472 per capita. This harvest has been reaped and displayed in variety at modern supermarkets and made available at relatively reasonable prices. However, without the use of chemical pesticides this elegant food table and variety of foods would be available only to the wealthy few. Officials of the U. S. Department of Agriculture have estimated that if we did not use fertilizers and pesticides, the cost of inferior quality food products to the American consumer would double in five years. In a few years there would be a critical shortage of essential foods.

National concern over the use of chemical pesticides reached a temporary peak in 1962 with the publication of Silent Spring, by Rachel Carson. (23) This book used emotional overtones to point to the misuse of chemical pesticides, their potential hazardous residues and their general environmental contamination. Public interest persisted, and in fact, clearly intensified immediately following distribution of this publication.

The controversy over the use and misuse of chemical pesticides caused former President John F. Kennedy to appoint a Scientific Advisory Committee to investigate the serious effects of pesticides on man's environment. The results of that investigation showed that use of chemical pesticides should be continued if the American consumer was to maintain the advantages accrued from their use. On the other hand, it was clear that proper usage was not simple and that while pesticides destroy harmful insects, plants and plant diseases, they may also be toxic to beneficial plants and animals including man.(91)

Further study of the pesticide problem in 1963 led to a congressional sub-committee hearing headed by Senator Abraham Ribicoff. Results of these hearings indicated a need for increased educational efforts to inform the general public about the proper and safe use of chemical pesticides rather than the need for enactment of additional pesticide control laws. Thus, the Congressional hearings again gave impetus to the necessity of continued use of chemical pesticides.

The arousal of emotional concern created by Silent Spring, the report of the President's Advisory Committee and the Congressional sub-committee hearings emphasized the need for increased educational efforts to inform the general public on the safe and proper use of pesticides. This national concern stimulated the Congress to appropriate $2.1 million to the Cooperative Extension Service of the United States Department of Agriculture for expansion of educational programs dealing with chemical pesticide usage.

The Cooperative Extension Service with its newly awarded appropriation was charged with the responsibility of educating the general public on the safe use of chemical pesticides. But before an educational program could be designed it was necessary to inquire about the composition of the general public and where these individuals lived. Population experts indicated that two-thirds of the 200 million people in the United States lived on one-third of the land. These people lived in megalopolises or at least within easy access to the Standard Metropolitan Statistical Areas (50,000 plus population). (44) Therefore, the United States had become an urban nation.

Recent evidence also shows that the general public in Virginia has become predominantly urban in character. Virginia is 67 per cent urban by population standards. (64) Consumers live within easy access to, or within 10 Standard Metropolitan Statistical Areas in Virginia.

For about ten years there has been a trend for the Cooperative Extension Service to increase its work with the urban audience. However, in the past fifty years, the agency has devoted most of its efforts to educate the rural portion of the general public. The significant ecological changes in the population have created an urbanized society which contrasts sharply with the past rural agrarian society.

With the move from a rural society to an urban society, one would expect changes in the attitude of individuals. Mrs. Ester Peterson, former Special Assistant to the President on Consumer Affairs, recognized that the middle and upper-middle income urban groups demand and support legislation for consumer protection. These groups mold the thinking of the Congress regarding legislation of drugs, chemicals and pesticides. Thus, the Cooperative Extension Service with its awarded appropriation, had to educate the middle and upper-middle class people on the importance of chemical pesticides. They had to know the attitude of these groups and had to learn the extension methods most effective in imparting knowledge and inducing attitudinal change.

Doubtlessly, the urban dweller of Virginia possessed a certain basic level of information about chemical pesticides and, consequently, formed definite opinions regarding their use, storage, buying and disposal. The extent of knowledge and the attitude of the Virginia urban dweller toward pesticides was largely unknown. Contact of the Cooperative Extension Service with the urban dweller has been limited and, because of this, little was known of the effectiveness of traditional methods employed by Cooperative Extension in reaching this new audience. Before an educational program could be directed toward changing the knowledge and attitudes of urban dwellers, certain benchmarks had to be established.

Funds from the $2.1 million Chemical Pesticides appropriation were made available to various institutions for special research grants. A research grant of $38,800 was awarded to the Chemical Drug and Pesticide Unit of Virginia Polytechnic Institute, Blacksburg, Virginia.

This present sub-study represents the third segment of a broad research program being conducted by the V.P.I. Unit and the Cooperative Extension Service in Virginia. The overall research effort concerned, "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides."

The objectives of the broad research program were:

1. To design and perfect techniques to measure attitude toward and knowledge of pesticides and chemicals.
2. To determine the present knowledge of and current attitude of middle-class urban adults toward chemicals and pesticides.
3. To ascertain, by using the above techniques, the relative effect of various extension methods used in a planned communication program in bringing about a change in attitude toward and knowledge of chemicals and pesticides on the part of middle-class urban adults.

## Research Problem

The Virginia Cooperative Extension Service is committed to educating the people of Virginia regarding the safe use of chemical pesticides. Before this educational process could be implemented in urban areas, it was necessary to determine the degree of information that urban dwellers possessed as related to governmental controls, agencies, departments and laws involved with food products. Information had to be obtained from the urban audience concerning their knowledge of the safe use of chemical pesticides. Likewise, efforts had to be made to ascertain the general attitude of the public toward effective use of pesticides for maintenance of an ample food supply as well as the attitude toward government control of pesticide use. This benchmark information was not available and the specific problem was that no one really knew the attitude or knowledge of this segment of the public concerning chemical pesticides or their effects.

## Purpose of This Study

The purpose of this sub-study is to establish benchmarks concerning the Virginia urban dwellers' level of knowledge and attitude toward chemical pesticides. It is designed to learn the initial scope and amount of information possessed by the middle-class urban dweller and the basic attitudinal level of these individuals regarding the safe use, sanitation and handling of chemical pesticides. This study provides the fundamental framework for future comparison with behavioral change induced by an educational program designed to inform the urban dweller on the effective use of chemical pesticides.

## Objectives of This Study

1. To determine the knowledge and attitude of middle and upper-middle income groups of urban dwellers regarding chemical pesticides.
2. To determine if there is a significant relationship between attitudes, knowledge and selected characteristics of the middle and upper-middle income urban dweller.
3. To establish guideposts to aid in the future development of effective programs designed by the Cooperative Extension educator for the urban dweller.

## Scope of this Study

This study is limited to a randomly selected sample of middle and upper-middle income dwellers in Richmond and Roanoke, Virginia.

## Definition of Terms

1. Attitude - refers to the mental disposition stimulated by an experience with an object, event or value in the environment which persists in the form of a response, either positive, negative or neutral. Attitudes in this study refers to the feelings or opinions stated by urban dwellers toward the use of chemical pesticides.
2. Benchmarks - refers to the first levels of evaluation measurement before any change or any further change occurs. This point, level or phase where the learners are before the plan for changing behavior goes into action is called the benchmark. For use in this study, the benchmark means the existing behavior position before any extension teaching has been given to the urban dweller on chemical pesticides.
3. Chemical Pesticides - refers to chemicals that are used to kill pests such as insects, weeds, plant disease--producing organisms, and rodents.
4. Knowledge - the act or state of understanding; clear perception of fact or truth; familiar cognizance;

cognition. Knowledge can be gained by actual experience; practical skill; technical acquaintance; or acquired by the sense of feeling or by intuition. Knowledge can be obtained by intellectual processes of abstraction and comparison. Knowledge is what is known (facts) and the ability of the individual to use facts to formulate certain principles of inference. Knowledge for the purpose of this study refers to what the urban dweller knows about chemical pesticides and government regulations concerning pesticides.

5. Urban dweller - in this study an urban dweller refers to a resident of an urbanized area of 75,000 population or more.
6. Middle class - in this study, the middle class refers to a resident in a middle and upper-middle income housing area who lives in an unattached, single-unit dwelling.

# CHAPTER II

## REVIEW OF LITERATURE

### Introduction

The purpose of this review was to relate the significance of literature findings to the establishment of the benchmarks concerning the Virginia urban dweller's level of knowledge and attitude toward chemical pesticides. This review of literature is related directly or indirectly to the three objectives set forth in the sub-study. In essence, the objectives involve:

1) The determination of the benchmarks (knowledge and attitude levels) of middle and upper-middle income class urban dwellers regarding chemical pesticides.

2) The determination of significant differences between the benchmarks and selected profile characteristics.

3) The establishment of guideposts to aid in the development of an effective chemical pesticide program for urban dwellers.

This review of literature will include:

1) The basis for an Extension Educational program.

2) The design of an Extension Educational program in the use of chemical pesticides for urban dwellers.

3) A review of the nature of knowledge.

4) A section on attitudes.

5) Findings on the nature of the urban population.

6) A review of Extension work in urban areas.

7) A resume of relevant research studies on chemical pesticides.

8) A summary.

The section regarding the basis for an Extension Educational program will include a brief history of the Cooperative Extension Service. This will point to the crucial need for the development of effective extension educational programs directed at changing human behavior.

The section dealing with the design of an Extension Educational program on the use of chemical pesticides will discuss the basic philosophy of the Cooperative Extension Service. A discussion of the need for benchmark data and obvious lack of such data concerning the urban dweller will be included.

The section on knowledge relates various definition of knowledge, the developmental transition of knowledge, extent of knowledge research and implication of the research findings to this benchmark sub-study.

The section concerning attitudes advances several definitions of attitudes, the components of attitudes, how attitudes are developed, research finding on attitudes and implications of these research findings to this benchmark sub-study.

The section regarding the nature of the urban population includes definitionsof urbanized areas, standard metropolitan statistical areas and suburbs. In addition, this section will provide and describe population characteristics of the middle and upper-middle income class urban dweller.

The section on Extension Education in urban areas discusses some relevant urban Extension research studies. A brief explanation will be given regarding the lack of knowledge or research about urban dwellers and the intended contribution to be made by this sub-study.

The section concerning chemical pesticides in this review of literature will discuss pertinent research studies on chemical pesticides conducted in other states. A discussion of the paucity of such studies on the topic chosen by the researcher and the obvious need for this study will be included.

A brief summary of the entire review of literature will follow the final section.

Information presented in this review of literature include reports of research and of authorities in the behavioral science fields of education, psychology, sociology, and social psychology. Behavioral science research studies on the urban dwellers' use of Chemical Pesticides did not abound in the literature reviewed. Therefore, it was necessary to use the research reports of these other disciplines and relate their findings to this sub-study.

## The Basis For An Extension Educational Program

Neiring (67) in a recent article stated:

"Chemical pesticides are the greatest single tool for simplifying the habitat ever conceived by the simple mind of man; however, through this simple tool man has the power to destroy." The key to the future use of chemical pesticides lies inherent in man's ability to communicate their proper use. Correspondingly, Egler (37) has written, "If we fail to communicate a rational approach for using chemical pesticides we may find that technology has become an invisible monster." Thus, the strict scientist must involve the social scientist in communicating sound scientific knowledge to society and seeing it translated into reality. In addition, Egler in a recent review of the pesticide problem wrote: "...95% of the problem is not in scientific knowledge of chemical pesticides, but in scientific knowledge of human behavior."(9)

It appears from these statements that future use of chemical pesticides depends upon the educator's ability to communicate scientific research knowledge to people. To achieve this goal, scientific knowledge of human behavior is essential. In addition, research and educational methods directed at changing human behavior is needed. Here, an educational organization such as the Cooperative Extension Service can make a contribution.

The basis for Cooperative Extension educational programs is to bring about the desirable, directed change in people. Since the inception of the Cooperative Extension Service, the principal emphasis has been to modify human behavior by teaching people to apply useful results of scientific research. This broad basis of extension educational programs was made possible in 1914 by passage of the Smith-Lever Act.(1) This law showed the purpose of the Cooperative Extension Service; that is,

A) To aid in the diffusion and assimilation of knowledge and information in Agriculture, Home Economics and related fields and,

B) To encourage the application and use of this knowledge.

In effect, the Smith-Lever Act indicated the crucial need for the development of effective Extension educational programs.

The success of Extension educational programs hinges on the ability of the educator to influence human behavior. This aspect has been considered significant by Tyler (86), who recognized three criteria in changing human behavior. These include:

1) The kind of behavioral level needing change must be specified,

2) The content or problem area must be specified and,

3) The people, audience or groups who are expected to change must be specified.

Raudabaugh (69) defined these behaviors that need to be changed; namely,

1) Interest
2) Ideals and purposes
3) Information, knowledge and understanding
4) Abilities, skills, habits and practices
5) Attitudes and emotional responses.

Furthermore, teaching is successful only when human behavior is changed in terms of attitudes, interests, gains in knowledge, development of skills and ability, and increased understanding. The present sub-study dealing with chemical pesticides follows certain assumptions set forth by Tyler and Raudabaugh that both knowledge and attitude must be recognized as vital constructs in a comprehensive study involving middle and upper-middle class urban dwellers.

## The Design of an Extension Educational Program On the Use of Chemical Pesticides for Urban Dwellers

One of the prime requisites for development of an effective extension educational program involving chemical pesticides is to assess the level of information and the kind of attitude possessed by these urbanites. One feasible method of securing this information is found in a basic premise expressed in the philosophy of the Cooperative Extension Service. This basic philosophy is to reach people where they are regardless of their present stage of education, social position or experience. Therefore, the extension educator must find out where these people are in terms of knowledge and attitude. This form of approach can be accomplished by analysis of benchmark data that reflects the behavioral level of this audience.

Benchmarks measure levels of information whenever samples are taken before an educational input. Such a need for obtaining benchmark data has been documented by Sabrosky (76), who considered that educational levels or "benchmarks" must be determined before the teaching experience takes place. Since a review of the literature revealed a lack of these benchmark studies, the present sub-study followed the logic that the extension educator needs to predetermine and fully select certain kinds of benchmarks which should reflect the feelings of this urban audience and, at the same time, aid in development of other kinds of extension programs suitable for this audience.

The benchmarks sampled in this present sub-study are knowledge and attitude of middle class Virginia urbanites. The constructs, knowledge and attitudes, are defined in view of their present-day usage. Their relevance to the extension educator is independently discussed for purpose of emphasizing their applicability with a program involved in dissemination of chemical pesticide information. These research studies and the implications for the extension educator are broadened below for benefit of direction.

## Knowledge

Various definitions of knowledge have been provided in the literature. Webster's (93) dictionary defines knowledge as "what is known (facts) and the ability of man to make certain principles of inference or judgement about what is known." Further elaboration indicates that "knowledge in the general sense is the information developed and conserved by civilizations." It is defined by Dewey (30) as "that assemblage of facts which is accepted as true or false by man." Bloom (14) defines the taxonomy of knowledge in education as:

> Those behaviors and test situations which emphasize the remembering either by recognition or recall or ideas, material or phenomena.

English and English (38) considered knowledge as "the body of understood information possessed by an individual or by a culture." It is that part of a person's information which is in accord with established fact. Simple knowledge is called apprehension (which includes perception) and more complex knowledge is called comprehension or understanding (which includes awareness of relations or meanings.)

## Development and Transition of Knowledge

Knowledge is developed on the basis of observation, verification, induction, deduction, experience, rigorous scientific testing and judgement of fact. Knowledge alone is sterile and static until it is acquired, used and applied by the individual. English and English (38) verify this point of view by recognizing that there is both functional knowledge and results knowledge. These psychological lexicographers say that knowledge is functional when it is applied and used and that the results of knowledge are shown through individual learning. From this standpoint, it appears that the development and transition of knowledge takes place through individual learning and application of information.

This transfer of knowledge is the process of learning. Since learning is essential for accummulation of knowledge, this process is considered worthy of definition. Loree (59) suggests that "learning is a relatively permanent change of behavior that occurs as a result of experience or practice." Sanders (77) states that learning is a result of the receiver's reaction to the message; it is a change in behavior--mental, emotional, or physical." The extension educator must be aware that as individuals learn new knowledge, they will manifest a permanent change in human behavior either by experience or by practice.

The force of motivation to which individuals openly respond before learning occurs contributes to the level of knowledge one possesses. Lindsley (57) defines motivation as "the combination of forces which initiate, direct and sustain behavior toward a goal. Motivation involves the inner drives, urges, desires and interests of the individual which makes a person want to learn new information." The extension educator must be cognizant of motivational forces which operate and make an individual want to acquire and use new knowledge. The degree of motivation determines the intensity, retention and use of new knowledge.

The measure of levels of knowledge has been accomplished by following previously developed guidelines. Procurement of information relies on criteria established for educational evaluation research studies.(21) (5) (71) Such research studies justify the reliability, objectivity, and validity of an instrument of observation known as the questionnaire schedule. The format for this schedule has been perfected to derive maximum levels of knowledge from specific questions about the use of chemical pesticides.

### Extent of Knowledge Research

The principal emphasis in research dealing with knowledge has been directed toward concepts, such as cognition, perception and self-concept. Pertinent studies and their significant points are described below for use by the extension educator.

1. Cognition - Largely determined by an individual's rational and logical responses.

Krech et al. (55) state that "cognition involves the individual's ability to group mental phenomena into a sequence of mental activities."

Krech et al. (55) recognize the cognitive domain of an individual as the product of --

A) Physical and Social environment
B) Physiological structure
C) Wants and goals
D) Past experiences

Bruner and Perlmutter (20) found an individual's judgement of other individuals (objects) is strongly influenced by the notions of groups which these individuals belong.

Birch (12) considers a cognitive change one which is initiated by a change in an individuals' information and that mere exposure to new information does not guarantee an individual will pay attention to or accept the new information. Furthermore, an individual's feelings, emotions and wants may prevent cognitive change.

Rokeach and Vidulick (73) report that cognitive change is in part governed by personality factors, such as "open or closed-mindedness." Individuals of open-mindedness are more willing to emotionally accept new information or attempt to solve new problems; close-minded individuals frequently rejected new information, ideas or solving new problems.

Fenkel and Brunswick (41) proposed that some individuals find it difficult to tolerate or manage cognitive ambiguities, inconsistencies and surprises. Such individuals tend to dichotomize all environmental confrontations. Individuals who were high in intolerance of ambiguity engaged in "black and white" thinking to form a simplex clearly organized cognitive system.

2. Perception-Depends upon the degree of an individual's environmental confrontation.

Berelson and Steiner (9) recognize that perception is the more complex process by which people select, organize and interpret sensory stimulation into a meaningful and coherent picture of the world.

Weiner (95) found that people not only look for things they need or want, but also the stronger the need, the greater the tendency to ignore irrelevant elements.

McClelland and Atkinson (60) found that as ambiguity by the stimulus increases and/or as the strength of motivation or subjective importance increases, people's interpretation will move in the more relevant direction; that is, they will tend to see things as they want or need to see them.

Lindgren (58) relates that the behavior of an individual is determined by his perception of himself and of the environment.

3. Self-concept-relates to the individual's image of self.

Combs and Snyggs (24) recognize that "self-concept is the part of the environment in which the individual is involved or has a psychological or emotional investment in the phenomenal self and responds to the phenomenal environment." The perceived self includes not only the self-concept, but also those aspects of the environment that an individual identifies with himself.

Mead (63) reports that the self arises in conduct, when the individual becomes a social objective experience to himself. This takes place when the individual assumes the attitude or uses the gesture which another individual would use and responds to it himself or tends to so respond.

Cooley (25) in his concept of the "looking glass self" considers a social image of self might be called the looking glass self. The self is most important in a reflection, largely from the minds of others.

These three constituents, namely cognition, perception and self-concept, embrace one's level of knowledge. First, an individual's concept of self influences his acceptance or rejection of new knowledge and information. Cognitive change by individuals is influenced by group participation, exposure to new information, feelings and emotions, degree of open or closed mindedness and ambiguous information. An individual's knowledge level depends upon the perceptual characteristics, such as need or desire for new information and also one's own subjective judgement concerning ambiguous information.

### Implications of Benchmark Results

Studies dealing with cognition, perception and self concept represent most of the information published on the subject of knowledge. Several factors seem to be associated with an individual's level of knowledge and, consequently, influence one's behavior pattern.

The principal factor rests in an appropriate definition of knowledge. The definition of knowledge expressed by English and English (38) appears to be the most plausible for use in this sub-study. As applied herein, knowledge would represent the body of information on the use of chemical pesticides possessed by the middle and upper-middle class urban dweller. This would constitute dynamic knowledge; that which is learned, applied and adapted to the situation of the urban dweller.

Judged by the interpretation of Krech _et al_. (55), the middle and upper-middle class urban dweller's knowledge about chemical pesticides would be a product of their:

1. _Physical and social environment_ - Physical surroundings, such as home, material items, social class, group, club, business affiliation, family life, special interest activities and residential community or area.
2. _Physiological structure_ - Ability to learn, intelligence level, educational level.
3. _Wants and Goals_ - Special interest activities, motivation to learn new information, ambition and personal investment in learning.
4. _Past experiences_ - Training with use of chemical pesticides, rural or urban background, educational and age levels.

One can assume that the urban dweller's knowledge about the use of chemical pesticides would be strongly influenced by the ideas and attitudes of other individuals within this income class--a line of reasoning expressed by research of Brunner and Perlmutter (20).

The investigation by Birch (12) suggests that urban dweller's knowledge about use of chemical pesticides can be changed with new information. The assumption that urban dwellers would completely accept new information would be misleading because feeling, emotions, attitudes and wants would prevent knowledge change.

The findings by Rocheak and Vidulich (73) could be interpreted as forming a relationship between open-minded urban dwellers and their readiness to respond to new knowledge or information about the use of chemical pesticides. On the other hand, close-minded individuals would reject new knowledge for need or use of chemical pesticides. Probably the former group would have a higher level of knowledge than the latter group. One would expect that the urban dweller would be more open-minded regarding the need for and general use of chemical pesticides and, thereby, display a higher general knowledge level.

Research by Frenkel and Brunswick (41) suggest that some urban dwellers would find it difficult to deal with inconsistent information. This would especially apply to release of information for or against pesticide use. Hence, some individuals would dichotomize their views to achieve consistency. One group would seek information pointing to the harmful effects.

Concepts on perception as expressed by Weiner (95) would apply whenever the urban dwellers strongly want or need to use chemical pesticides so intensely that they would ignore any harmful consequences.

McClelland and Atkinson's (60) interpretation of perception would indicate that when information on chemical pesticides becomes ambiguous, urban dwellers would interpret the need for chemical pesticides as they subjectively judged the necessity for them. One would assume that if urban dwellers had information pointing to the need for maintenance of the nation's food supply, that they would favor the continued use.

The self-concept research studied by Mead (63) and Cooley (25) would indicate why individuals respond differently to the same information. An individual's image of self would form the basis for behavioral activities. Urban dwellers would respond to knowledge questions regarding chemical pesticides as this information relates to the concept of self.

Summarily, this sub-study to determine the knowledge level of middle and upper middle income class urban dwellers will be based on the culmination of variables. A determination of a finite benchmark value on the knowledge level has limited meaning unless these other research factors are considered.

## Attitudes

Attitudes are behavioral constructs; they require continual interpretation. The extension educator is faced with this problem of scrutinizing these attitudes so as to obtain maximum satisfaction for all concerned. The educator must try to reinforce, change and provide direction if this is to be accomplished. Several definitions have been suggested by social psychologists. In general, they seem to agree that an attitude consists of three main parts:

A) An attitude object
B) Set of beliefs or opinions that an object is either good or bad
C) A tendency to behave toward the object to keep or to get rid of the object.

Allport (3) defines an attitude as a mental and neural state of readiness organized through experience, exerting a directive, dynamic influence upon the individual's responses to all objects and situations with which it is related.

Berelson and Steiner (9) see an attitude as a person's preference for one or another side of a controversial matter in the public domain. English and English (38) relate attitude as an enduring learned predisposition to behave in a consistent way toward a given class of objects. Rosenberg (74) says it is a relatively stable response to an object. Katz and Stotland (53) mention an attitude as a tendency or disposition to evaluate an object or symbol of that object in a certain way. Webster's (93) dictionary defines an attitude as a manner of acting, feeling or thinking that shows one's disposition or opinion.

Krech _et al_. (55) define it as an enduring system of positive or negative evaluations, emotional feelings and pro or con action tendencies with respect to a social object. It consists of three components:

1. _Cognitive_ - beliefs (knowledge) of the individual about the object.
2. _Feeling_ - refers to the emotions connected with the object.
3. _Action tendency_ - includes all the behavioral readiness associated with the attitude.

## The Development of Attitudes

People develop attitudes; they establish patterns of behavior which will be reflected throughout their lifetime. This pattern of development can be influenced whenever one is exposed to new information, whenever wants are satisfied, whenever they participate in groups, and by specific manifestation of their own personality. The niche of the extension educator is to investigate these particular facets throughout the life of the urban dweller.

1) Satisfaction of wants

A full account of the role of want satisfaction has been suggested by Rosenberg (74). He states that sign and intensity of feelings toward the object of an attitude are associated with what the individual believes to be its instrumental value in facilitating or blocking achievement of goals.

Therefore, the extension educator needs to examine some of the many reasons why certain attitudes become favorable and other attitudes become unfavorable. The key to this problem will make the extension educator more accurate in predicting changes in human behavior.

2) Exposure to Information

There is always some difficulty in trying to predict the attitude of an individual. The ability to predict is increased whenever the extension educator can introduce new information. The introduction to new information provides a point of importance upon which the educator can focus. The exposure to new knowledge in part must depend upon the existing pool of present attitudes held by the individual.

Krech _et_ _al_. (55) recognizes that an individual's attitude is shaped by the information to which one is exposed. The way a person gains knowledge contributes to the development of an attitude toward that object. All attitudes do not reflect facts. Individuals develop attitudes characterized by divergence from facts, such as superstitions or delusions.

Morisette et al. (66)emphasize that new knowledge is frequently used to form attitudes which are consistent with pre-existing related attitudes.

Unquestionably, the extension educator is faced with the problem of analysis of the individual level of knowledge and its significance upon the individual's attitude. This level of knowledge, as explained previously, is influenced by the cultural background, social status, and intelligence level of the individual.

A short statement expressed by Berlo (10) emphasizes the importance of knowledge impact on attitude. He recognizes that an individual is a product of his own culture and that his level of knowledge affects his attitude. Culberson (27) considers that any resistance to attitude change may be high in the individual with a high level of knowledge. Furthermore, the existence of incorrect information in the mind of the individual can also contribute to an favorable or unfavorable attitude. Davis (28) recognizes that one can gain an unfavorable attitude when they are misinformed or when they misinterpret information.

3) Group affiliation

The reasons why people participate in group activities are about as varied as the individuals themselves. Whether they belong or do not belong to certain groups often depends upon their financial resources, location, social status, and their interest in the group activities. An attitude expressed by a certain group frequently determines the person's own outlook, reflects on his personality, and contributes to the general attitude of the individual.

There are at least two social scientists who recognize the importance of group affiliation in the development of the individual's attitude. Both Riesman (72) and Kelly (53) recognize that individuals develop attitudes based on the beliefs, values and norms of the group with which they are associated.

While the extent of belief, and interpretation of values are not immediately available to the extension educator, they comprise a large body of information to be examined before a full picture of the urban dweller's norms are determined.

4) Personality

The extension educator must rely on personal contact in an effort to evaluate the personality type of urban dwellers. Before teaching can be effective, the extension educator must ascertain the general "feeling" of the audience to be reached. The presence of a positive or negative personality affects the kind of attitude held by an individual.

An extensive study has been made on the relationship of personality type and the "teachability" of individuals. Bills (11) has found that there are three personality types (++), (+-), and (-+) operating in society. These types of personalities are represented as follows:

(+ +) people who accept self and accept others
(+ - ) people who accept self, reject others
(- + ) people who reject self, accept others

Adorno et al. (2) report the dynamic influences of personality on the development of an individual's attitude. Essentially an individual is accepted on the basis of reflection of attitude which is consistent with his personality. A similar view is expressed by Cooley (25) and Mead (63) who recognize the importance of self-concept in the production of personality.

Since the extension educators are constantly trying to solve the complex array of attitudes expressed in the urban community, they must be aware of this source of available information, that is, the individual's personality. In spite of the difficulty of securing factual information about what reflects the urban dweller's personality, the extension educator must acquire a "feeling" to function effectively within the urban community.

Measurement of attitude

To evaluate the attitude of an individual, it is important to measure the responses of individuals by some scientific means. There are at least three types of valid, reliable scales which have been extensively tested for attitude evaluation. The scale selected for the present sub-study was the summated type. This scale introduced by Likert (56) has the advantage of measuring the degree of positive or negative responses by individuals. On the other hand, this advantage is not offered by the differential scale of Thurston (84) or the cummulative series scale of Guttman (47) or Borgardus (15).

Research on Attitudes

Studies reviewed and discussed within this section which provide insight primarily into the area of change in attitude. Because of the vast amount of literature dealing with this area, per se, only the research findings that encompass the problem designed herein for the extension educator will be considered. This section discusses the ramifications that influence attitude change. These are:

A) Types of attitude change
B) Factors influencing attitude change
C) What constitutes the stability of an individual's attitude
D) Sociological factors influencing attitude change

A) The availability of information on the types of attitude change is scarce. The most extensive study which sheds some light on this theoretical aspect centers on the concept of change in direction of attitude. Krech et al. (55) recognized two types of attitude changes:

1) Incongruent change - Direction of change is toward the sign opposite that of the original attitude. This means the individual's attitude changes from a positive to a negative position.

2) Congruent change - Direction of change is congruent with the sign of existing attitude. This implies that there are degrees of positive or negative attitudes and congruent change will move from a weakly positive position to a strongly positive attitude.

Another possibility of incongruent attitude change would be from an undecided or no opinion position to a positive or negative position.

B) There is no better time than the present for the extension educator to become aware of the wealth of factors that materially affect an attitude change within the framework of the urban dweller's repertory of information. The extension educator must keep a clear-cut objective of the accomplishment of measurable changes in attitudes of the urban dwellers. These factors tobe evaluated are the urban dweller's extremeness of attitudes, consistency of attitudes, and centrality of related values, intelligence level, cognitive needs and form and content of information.

1) Extremeness of attitude

Many individuals become quite firm in the attitude that they express. This can range from both ends of the spectrum, that is, they can show very little change in attitude by expressing an absolutely positive or an absolutely negative kind of attitude. Tannebaum (82) has recognized this significant aspect of attitude. He reports the more extreme or intense the attitude, the smaller the change. He also states that the mean of attitude change induced by a persuasive communication is inversely proportioned to the degree of extremeness of the original attitude.

2) Consistency of attitude

Based on the limited amount of literature, consistency seems to be a factor to be contended with by the extension educator. McGuire (61) reports that a consistent attitude tends to be a stable one, the cognitive components support each other. This seems to indicate the more inconsistent the attitude system is, the more easily the attitude can be changed in the direction of increased consistency.

### 3) Attitudes and centrality of related values

Values are those qualities of precise significance which enter into the intimate complexity of individuals. Often they constitute the individual's guidepost to decision making (68). An attitude is the overt reflection of an individual value system. Krech et al. (55) support this concept by stating "an attitude that is supported by an individual culture and value system is difficult to move in an incongruent direction."

### 4) Intelligence level

While it is easy to employ the intelligence quotient as a means of intelligence evaluation, the extension educator does not have this source immediately available for analysis. However, the intelligence level possessed by an individual determines the rate of attitude change. The finding in a study by Swanson (80) showed the intellectual ability to be the most important trait for predicting who will learn and understand information. It is logical to assume that the more intelligent person being more highly educated, ought to respond more favorably in attitude change than someone who is less educated. The recognition of extensive education as being correlated positively with attitudes has been expressed by Krech et al. (55).

### 5) Cognitive Needs

People are continually in need of relief from daily encounters. This pressing need plays a dominant part in the life of every person. Whether it manifest itself with overt acts or is secluded, it is important that extension educators recognize the limits of an individual's need. Kelman and Cobler (54) proposed that persons who are high in need for "cognitive clarity" react strongly to new information which challenges their existing attitudes. For example, a person who typically reacts to ambiguity by seeking clarification and understanding, tends to be open to challenging new information and his attitude would tend to change in an incongruent direction.

6) Form and content of information

In addition to the previously mentioned factors, people are faced with certain other barriers which influence attitude change. Krech *et al*. (55) conclude from numerous research studies that the effect of new information on attitude change depends upon the nature of the communication situation, the characteristics of the communicator, medium of the communication and the form and content of the message.

C) The degree of balance in an attitude differs depending upon the individual. The problem of finding out whether attitudes are stable or unstable is nearly too immense for evaluation. Nevertheless, the research studied indicate that there are several predominant factors which enter this complex domain.

D) While it is not in the scope of this present sub-study to evaluate all the social factors that influence attitude, there appears to be certain ones which require evaluation. These include social class, ethnic status, place of residence, age, and sex.

Among the sociological factors which have a significant impact on the individual's attitude are:

a) Social class membership

Acceptance or rejection within an individual's own social class definitely has an impact on his attitude. Berelson and Steiner (9) report that the more strongly people identify themselves with a given class strata, the more sharply their attitudes are defined by its boundaries. For example, they state that upper class citizens are more interested in public affairs than lower class citizens.

b) Ethnic status

Ethnic status has an enduring influence on the secular activities of individuals.

c) Place of residence

Place of residence has an impact on the individual's attitude when the geographical region and the rural urban location are considered. Among the sociological factors which have a lesser degree of influence on an individual's attitude are age and sex.

a) Age -- Increased age appears to create individual attitudes which are more conservative and authoratative in nature. (9)

b) Sex -- Research shows a difference between the value system of men and women which generally create difference in attitude. (9)

Implications of Attitude Research

There appears to be several implications involving the studies on attitudes which are applicable for this sub-study. For the sake of clarity, an attitude is considered herein as any mental disposition stimulated by an experience with an object, event or value in the environment which persists in the form of a response, either positive, negative or neutral.

One can assume from the research studies on the development of an attitude that urban dwellers would develop a favorable attitude toward the use of chemical pesticides if these chemical pesticides satisfied their need or wants. Urban dwellers would recognize the instrumental value, such as that expressed in the study of Rosenburg, (74) of the pesticide and, therefore, favor their use.

There seems to be little doubt that the level of knowledge possessed by urban dwellers would be a factor to consider for study. This line of reasoning would be in agreement with the studies by Krech _et al._ (55). Furthermore, one would expect if the urban dweller's attitude toward the use of chemical pesticides is weakly favorable, the introduction of new knowledge could be used to strengthen his attitude.

Doubtlessly, the urban dweller will have his array of emotions, values, and even superstitions which will necessarily influence attitudes toward the use of chemical pesticides. An example could be found in the conservative attitude of many Virginians, who might oppose federal government control on chemical pesticides. One would expect many Virginians to express an unfavorable attitude simply on the basis of their conservative nature. In this sense, the attitude would not be based on facts, _per se_, as discussed by Krech _et al._ (55).

Although there is little evidence to support that social factors would influence a favorable attitude toward the use of chemical pesticides, the extensive studies of Riesman (72) and Kelly (53) suggest that an urban dweller's attitude would be significantly influenced by the norm of his social group. The effect of opinion leadership is problematical in attitude formation but one would expect some effect based on the studies of Katz and Lazerfeld (51).

Extremeness in attitude seemingly will represent a factor to be evaluated for the Virginia urban dweller. One might expect that urban dwellers who respond strongly positively or negatively toward the use of chemical pesticides would show a smaller degree of attitude change when exposed to new information. This extremeness in attitude concept is reinforced by the studies of Krech _et al._ (55) on incongruous-congruous attitudes, and by the studies of Tannenbaum which expresses the view of the more extreme the attitude, the smaller the change.

One would expect urban dwellers to exhibit a response toward the use of chemical pesticides consistent with their other attitude on most issues. This line of reasoning would coincide with the consisting concept expressed by McGuire (61).

Based upon the level of intelligence possessed by the urban dwellers, one would expect, the higher the intelligence level the more favorable the attitude, and the lower the intelligence level the more unfavorable the attitude. This seems to be the view held in the general statements of Swanson (80) that an attitude changes depending upon the intelligence level. Furthermore, open minded urban dwellers would tend to seek clarity and understanding of the pesticide problem and they would accept new knowledge readily. This is supported by the research finding of Kelman and Cobler (54).

The manner of presentation of chemical pesticide material would seem to be a factor entering the attitude response of the urban dweller judged by the studies of Krech et al (55) report that attitude change is based on the effectiveness of the message presented.

The degree of interest expressed by the urban dweller ought to become part of the attitude change. Individuals experiencing many areas of interest probably will have a favorable attitude while those with limited interest will have an unfavorable attitude. This interest concept coincides the views expressed by Berlson and Steiner (9).

Whenever the chemical pesticide controversy becomes ambiguous, urban dwellers will probably change their attitude about pesticide application. They might recognize the need and modify their belief for consistency; or they might wait to accept some new information about chemical pesticides. This supports the research findings by Katz (52).

The social class to which urban dwellers belong conceivably would influence attitude much more than age of the group. Social status and place of residence have been shown previously to be of more value for analysis by the extension educator than has the age of the group (9).

Summarily, the attitude research in the disciplines of sociology and social psychology have some real implications for the extension educator. These implications seem to say that a determination of a finite value on attitude has limited meaning unless consideration is given to the environmental elements which the benchmark on attitude reflects.

## The Nature of the Urban Population

Since this is a sub-study involving the urban dweller, certain characteristics of the urban population need to be clarified.

### Urban Population

The 1960 census (88) defines an urban population as the composition of all persons living in areas of 2,500 inhabitants or more, incorporated as cities. An urbanized area consists of one or more cities 50,000 (89) or more and all the nearly settled suburban territory, or urban fringe. The (88) standard metropolitan statistical area has a nucleus containing a large city of at least 50,000 inhabitants. Contiguous counties are added to the metropolitan area if they meet certain specifications. Urban (88) fringe includes the densely settled outlying urban places, including both incorporated and unincorporated areas around cities of 50,000 or more. The suburbs represent that area just outside the core of the central city.

Equally important in the discussion of the urban population is a designation of the middle and upper-middle income class.

Criteria for stratifying people are based on many standards. Warner *et al.* (92) considers housing, income and occupation as the predominant factors for stratifying individuals. His definitions seemed plausible and, thus, were accepted for use in this present sub-study. Warner *et al.* (92) considers the middle-income class as those non-managerial office workers, small business owners and well paid blue collar workers whose families desire acceptance and respect from white collared dominated clubs and churches. They value doing a good job, being neat and respectable and having homes built on the right side of town. They assume pride in clothes, a college education and pseudo-independence. An upper middle income class is composed of individuals having moderate success in professions, owners of medium-sized businesses and "organizational men," (94) including junior executives and apprentice professions. Most are college educated; they place high values on social participation, attractive home decor, and on civic and cultural interests. Both classes of individuals are assumed to comprise that segment of the urban ring around the central city core whose knowledge and attitudes are assessed in this present sub-study.

## Extension Education in Urban Areas

An understanding of the urban population is essential for the Cooperative Extension Educator to do an effective job of teaching the urban dweller about the safe and effective use of chemical pesticides. The Cooperative Extension Educator also needs to be aware of certain relevant studies of Extension work in urban areas. Moreover certain urban sociology studies have implications for the extension educator. Therefore, a brief resume of these Extension and urban sociology studies will be discussed.

Blalock *et al.* (13) found that only a small percentage of urban residents are aware of Extension Services. Echard *et al.* (36) found the public still lacked knowledge of Extension programs even after much information is disseminated by mass media. Brown (19) and Trodahl (85) suggest that there is an urgent need for urbanites to be informed of Extension directed programs.

Brown (19) related that urbanites are willing to pay for information involving lawns, flowers and shrub care. He further relates that the urbanite seems dubious of Extension programs.

Urban sociology research studies revealed that urban residents have a definite commitment to gardening (33). Consequently, one might expect urbanites to use pesticides, have some knowledge about them and to form definite attitudes about them.

The literature reveals some six studies regarding profile characteristics. (32) (94) (43) (39) (96) (49) This sub-study also considers certain profile characteristics of the urban dweller as age, education level, place of residence before 18 years, membership in organizations and special interest activities. Such profile characteristics were limited in the urban sociology studies reviewed, and therefore, fell short of meeting the needs for the Cooperative Extension educator.

Such studies on Extension work in urban areas and urban sociology point to the urgent need for research about the urban dweller. This sub-study should make a significant contribution for future Extension work in urban areas.

## Research Studies of Chemical Pesticides

From the advent of Silent Spring by Rachel Carson (23), numerous articles in periodicals and journals revealed the pros and cons of chemical pesticide usage. The concensus indicated that chemical pesticides are needed for the maintainance of the health and food supply of man. However, there is also a vital need to educate people on the safe and effective use of these chemicals. (70) (50) (65) (62) (79) (22) (90) (31) (29) (81). These articles provided the need for behavioral science research studies on the use of chemical pesticides. Since the majority of chemical pesticides were used by the rural dweller, most of the published behavioral research was done with this audience. The results of these studies which have implications for this sub-study are summarized below:

### Iowa Chemical Pesticide Study

A study by Beal *et al.* (7) designed to determine the knowledge and attitudes of Iowa farmers toward the use of chemical pesticides showed that:

1) In response to a series of knowledge questions, Iowa farmers scored 54.7 percent correct, 18.9 percent incorrect, and 26.4 percent "no opinion" or "don't know."

2) In general, the knowledge questions showed that

    a) The farmers had little knowledge concerning the governmental agency responsible for enforcing the proper use of pesticides.

    b) The farmers had little information on specific chemical names and uses of pesticides unless they had had some personal experience with its use with livestock, insects or plants.

3) The responses to attitude questions among Iowa farmers were more positive than negative. In general, most farmers:

    a) Did not believe that agriculture chemicals were harmful if properly used.

    b) Thought that death could result from improper handling.

    c) Recognized residues were too low to affect health.

d) Thought dealers had information available about the safe application of pesticides.

e) Thought that users should assume responsibility for pesticide use.

Iowa farmers firmly agreed that chemical pesticides destroyed wildlife and polluted waters. Some farmers agreed and some disagreed that agricultural chemicals provided a good way to kill pests; some thought that natural enemies are not necessarily helpful in killing insects. A mixture of responses was obtained toward:

1) Imbalance of nature
2) Danger from eating foods treated with pesticides
3) Insecticides kill other soil life
4) Whether agricultural chemicals should be labeled as poisonous

Nebraska Chemical Pesticide Study

A study by Booth *et al.* (16) compared the use or non use of chemical pesticides in Nebraska with knowledge, attitude and demographic variables such as educational or occupational levels. These researchers concluded the following results which seem relevant to this sub-study:

1) The extent of the individual's knowledge of chemical pesticides and safe and proper practice to be employed was not found to be related to the number of different chemicals used.

2) The heavy user of chemical pesticides was not necessarily more knowledgeable in the use of chemical pesticides than a light or non-user.

3) Non-farm people relied more heavily on advertisements and labels for sources of information while farmers relied on pesticide dealers and the county agent or Extension Specialist.

4) It was noted that the individual may have a great deal more knowledge of the safe and proper use of chemical pesticides at the time he is making application.

5) The farmers were just as likely to engage in unsafe practices as were non-farmers.

6) A general knowledge of pesticides use was not highly correlated with proper use.

7) There was a decided tendency among heavy users to achieve a higher level of formal education than the light or non-users. The heavy users were more likely to have a higher occupational status. This tendency was shown among non-farmers also, but the trend was not as pronounced.

8) The typical unsafe pesticide user in Nebraska used only one or two chemicals a year. If he was a farmer, he spent less than 200 hours per month farming in season, was not apt to talk to pesticide dealers about chemicals he was using, was under 30 years of age and had small children and rented his home. The unsafe non-farmer lived in an apartment, and had less than a high school education.

### Wisconsin Chemical Pesticide Study

A description study by Ross et al. (75) entitled "Communication Patterns Among Rural Wisconsin Residents on Pesticides Use" looked into two behavioral phases:

1) Farmers' adoption patterns and their information behavior on the use of a particular pesticide.

2) How some social and psychological variables are related to pesticide knowledge and use.

The second phase of the Ross et al. (75) study had little relevancy to this study, therefore, only the conclusion from the knowledge and attitudes part of the study will be included in this review of literature. Knowledge questions of this Wisconsin Study were based on farmer's information concerning awareness and use of Atrazine Larox (pesticide).

1) In general, the farmers' knowledge level concerning use of the chemical pesticide was relatively high. (5 of 8 questions scored 60% and above while 3 questions scored 30% and below.)

When knowledge was compared to demographic characteristics, Ross _et_ _al_. (75) concluded the following:

1) Correct knowledge of pesticide terms tend to be positively associated with high credibility toward specialized information sources such as pesticide industry representatives and university research people. It was negatively associated with high credibility toward less specialized sources such as county extension agents and farmers.

2) Those farmers who were innovative tend to have better knowledge as well as to get informed of pesticide practice earlier than others.

Results of that investigation found no significant association with attitudes concerning danger of pesticide use and agricultural need for pesticides. People who had a great deal of knowledge of pesticide terminology were more likely to think "Agriculture cannot continue to produce without chemical pesticide."

Pennsylvania State Study

Bealer and Willits (8) studied the "Public Concern Over the Use of Pesticide" of the 1075 interviews with Pennsylvania residents 18 years and older they found:

1) The population consisted of 48% partially resolved worriers (some or little concern), 46% non-worriers and 6% unresolved worriers (great deal) about danger of farmers using pesticides.

2) Eleven percent perceived some danger involved with eating foods treated with pesticides, while 6 percent worried a great deal.

3) A study of their profile characteristics failed to show any significant differences between the two groups regarding:

   a) Sex

b) Education

c) Level of income

d) Current place of residence

e) Residence during first 15 years of life

f) Religion

g) Church attendance

h) Participation in civic organizations

i) Farmers lack of experience in handling pesticides

j) Perceived adequacy of food processors handling of products

Statistical differences existed among the following items:

1) The worrier showed a higher awareness of the 1959 cranberry incident than did non-worriers.

2) The non-worrier indicated decreased concern over pesticide usage as their awareness of the level of government inspection increased.

3) The non-worrier saw farmers as more careful in use of pesticides than did worriers.

4) Fewer worriers felt washing fruits and vegetables to remove pesticides as effective as did non-worriers.

Bealer and Willits could not determine if exposure to mass communication media had a significant effect on pesticide use.

Virginia Chemical Pesticide Study

Another sub-study by Graham (45) contributes further information on the characterisitcs of the urban public and their general use or non-use of chemical pesticides. Graham drew a profile of the middle class urban woman in Virginia based on a number of selected variables. In addition, she compared users and non-users of chemical pesticides among the middle and upper middle class urban women in Richmond and Roanoke, Virginia.

Profile of the urban woman - 394 respondents

1) Median age was 40 - 49 year range.

2) The majority of women spent the first 18 years of their lives in the city.

3) The median educational level was 12.4 years of formal schooling completed.

4) Approximately one-half of the women were members of selected organizations.

5) Of the special interest activities, the majority of women read books, raised and arranged flowers.

6) Most of the women were concerned with pollution of the environmental surroundings.

In comparison of user and non-users of chemical pesticides, Graham found the following:

No significant differences in:

1) the place of early residence as a factor in determining the use or non-use

Significant differences were found between

1) The degree of involvement in civic organizations by users and non-users of pesticides.

2) The educational attainment level of users and non-users of pesticides.

Alabama Chemical Pesticide Study

Dunkelberger and Johnson (34) reported on the knowledge and attitudes of Alabama pesticide dealers. These researchers found that:

1) Alabama pesticide dealers had a general knowledge of pesticides, but they lacked an adequate level of competence in understanding of pest problems and recommended treatments with pesticides.

2) The more informed dealers were those who had the larger dollar volume of pesticide sales (up to 80% of his total business operation).

3) Ample knowledge on the safe use and recommended practice was particularly lacking among dealers having a small volume of pesticide sales (20% or less total business operations).

4) Dealers with favorable attitudes spent more time in learning about safe pesticide use.

### Nevada Chemical Pesticide Study

Marketing information on pesticides and agricultural chemicals is currently under study at the Mac C. Fleischman College of Agriculture, University of Nevada, directed by Pesticide Specialist, Lloyd Stitt (78). Early findings from this study indicated a definite need to educate people in various communities, regarding terminology, tolerance, toxicity and specific points on difference in pesticides.

### Illinois Chemical Pesticide Study

Another study conducted by the Department of Home Economics, University of Illinois under the direction of Marilyn Dunsing (35), dealt with consumer reaction to the use of pesticides on agricultural products.

Presently, no additional responses have been received from other active researchers in this field; however, correspondence with the Scientific Information Service, Smithsonian Institute, indicates another study in progress in the United States. T. M. Brooks (18), University of Connecticut, is studying the relevance of educational levels and socio-economic characteristic to awareness and attitude levels of consumers regarding pesticide use for control of insects and rodents.

Again, such studies reviewed in this section indicate the limited availability of research, knowledge and attitudes of urban dwellers toward the use of chemical pesticides and points to the need for this sub-study.

## Summary

The future use of chemical pesticides depends upon the ability of the Cooperative Extension educator to influence the level of knowledge and the general attitude of urban dwellers. However, there is a paucity of information which precisely explains the relationship of both the individual's knowledge and attitude toward the application of chemical pesticides within urban communities. Part of this difficulty rests in the fact that few studies have sought to determine if the individual's behavior can be modified once they are exposed to a teaching situation.

The behavioral science field is filled with studies dealing with definitions of knowledge and of attitudes. Numerous sociologists and psychologists have outlined a multitude of constructs within each of these two major categories of knowledge and attitudes. Some of these constructs are pertinent for the Extension educator and must be evaluated before a suitable program is designed which stresses application of chemical pesticides in urban communities.

The definition for knowledge that seems to apply satisfactorily for this present sub-study represents that body of information on the use of chemical pesticides which is possessed by the urban dweller. The middle and upper-middle class urban dweller's level of knowledge about chemical pesticides is influenced by his physical and social environment, level of intelligence, motivation and past experiences. Any benchmark determination on knowledge has limited meaning unless consideration is given to the urban dweller's ability to handle new information, emotion, open or closed mindedness, ambiguity and inconsistency. Unless wants, goals and self-concepts are perceived, there will be an incomplete picture of this knowledge relationship in application of chemical pesticides.

The definition of attitude accepted within the framework of this sub-study is considered as any mental disposition stimulated by an experience with chemical pesticides which persists in the form of a positive, negative or neutral response toward their use. Attitudes are enduring systems which are activated and expressed throughout an individual's lifetime. The urban dweller's attitude develops as a result of satisfaction of wants, exposure to information, group affiliation and the type of personality. Moreover, the urban dweller's ability to change an attitude depends upon the extremeness within an attitude, emotional response, knowledge, opinion leadership, group norms, interest in issues, intelligence level, educational level and the degree of ambiguity of the information.

In addition, several sociological factors enter into the maintenance of an attitude. One can assume there will be a significant impact brought about by social class, ethnic state as well as the place of residence of the urban dweller. Among the lesser factors to be evaluated would be age and sex of the individuals.

Certain characteristics of the urban dweller shows that he lives in a city of 50,000 or in a standard metropolitan statistical area. In addition, the urban dweller studied in this sub-study is in the middle and upper-middle income class. The characteristics of the middle-class urbanites show them as non-managerial office workers, small business owners, or well-paid blue collar workers who place high value on doing a good job and being respectable. The upper-middle income dweller is composed of individuals having moderate success in profession, owners of medium-sized businesses and junior executives. These are usually college educated.

The behavioral studies on chemical pesticides were largely representative of the rural population. Farmers recognized the harmful effects of chemical pesticides but felt that if pesticides were used properly, little danger would be realized from their use. In general, the behavioral studies concerning the use of chemical pesticides were limited. There appears to be a strong need for research on the knowledge and attitudes of the urban dweller toward the use of chemical pesticides.

# CHAPTER III

## METHODOLOGY

### Population

Data for this sub-study were taken from the primary study, (described on page 6). The primary study was designed to study middle and upper-middle income dwellers in the urban areas of Roanoke and Richmond, Virginia regarding their knowledge of and attitude toward pesticides. This study included audience profile characteristics.

### Randomization Procedures

Random sampling for the primary study was designed by Dr. Charles Ramsey[1] one of the consultants for the study. The sample was limited to those urban residents who were:

1. Residents of a metropolitan population area of 75,000 or more.
2. Residents of a middle and upper-middle income housing area.
3. Residents living in single unit, unattached dwellings.
4. Residents of households with equal number of homemakers and male heads of households.

Census tracts obtained from the U. S. Bureau of Housing were employed for the determination of the sampling areas in Richmond (87) and Roanoke. (87) Once the areas were determined, Extension Agents, Agriculture in Richmond and Roanoke respectively were asked to revise the designated sections in light of recent changes in real estate values. The selected areas were numbered consecutively according to blocks. The blocks for sample interviews were selected according to a book of random numbers. The blocks were further randomized by houses within the selected blocks by a technique designed by Dr. Charles E. Ramsey. The house randomization plan appears below:

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[1] Ramsey, Charles E., Professor, Research Methods, University of Minnesota, 1965. He also served as Chairman and Professor, Colorado State University, 1962-65, and is the author of five books.

Richmond

Seven houses in each block were sampled, if the block was square, one corner house, two from opposite sides and one each from the other side were selected. Next door neighbors were avoided.

If a block was rectangular, one corner, two on the longest sides and one from the other side were selected.

For a three sided block, two houses from each side and one corner house were selected.

Roanoke

Five houses were sampled from each block; one corner house, one on the south side, one on the east, one on the north, and one on the west were selected. Next door neighbors were avoided.

In the case of a three sided block, two houses were selected on the longest side.

Sample

The sample was composed of 1197 interviews made in Richmond--600 before the educational program was conducted and 597 after the program was completed. In the control group (Roanoke), 201 interviews were made concurrently with interviewing in Richmond before the informational treatment and 213 respondents drawn at the same time the post-treatment sample was taken in Richmond. This sub-study will be concerned only with the 801 interviews made in the pre-treatment samples.

## Instrument of Observation

The instrument of observation used in the primary study was a personal interview questionnaire schedule. The questionnaire was designed by Drs. W. R. Van Dresser[2] and M. C. Heckel[3] original project leaders for the primary study. Mrs. Laurel Sabrosky[4], a private evaluation consultant, assisted project leaders with organization of the questions and schedule for securing interviews. The questionnaire schedule consisted of 70 questions. The first 51 questions were used in sampling the pre-treatment group which supplied the data for this sub-study. This portion of the questionnaire schedule is reproduced in Appendix A.

This section of the questionnaire schedule focused upon:

1. Attitude of middle and upper-middle class urban dwellers toward the role of pesticides.

2. Audience's knowledge of buying, using and storing pesticides correctly and safely.

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[2] In 1966, Head, Chemical Drug and Pesticide Unit, Cooperative Extension Service, Virginia Polytechnic Institute.

[3] In 1966, Professor and Head, Extension Education, and Extension Training Leader, Cooperative Extension Service, Virginia Polytechnic Institute.

[4] Laurel Sabrosky, formerly Extension Research Specialist in Evaluation, Research, and Training, Federal Extension Service, United States Department of Agriculture.

3. Audience's knowledge and attitude toward regulations and legislation concerning pesticides.

## Pre-Testing the Instrument of Observation

The questionnaire schedule was pre-tested by Drs. W. R. Van Dresser and M. C. Heckel, initial project leaders for the primary study. Each question was pre-tested for legibility, lucidness and objectivity. Wives, secretaries and neighbors within the middle and upper-middle income class categories examined and answered the questions. The schedules were re-evaluated and revisions made where necessary.

## Collection of Data

Project leaders for the primary study employed a professional research agency, Psychological Consultants, Inc., 1804 Staples Mill Road, Richmond, Virginia, 23230 to make the interviews. Pre-treatment interviews were conducted in July and August 1966 by 29 interviewers.

## Analysis of Data

### Coding and Scoring

Following data collection, the interview schedules were coded and scored and the results were punched on IBM cards. IBM 7040 and 1401 computers, available at the Computer Center, Virginia Polytechnic Institute, Blacksburg, Virginia, were used in calculating average scores.

Each question was coded so individual responses could be transferred to IBM cards. This provided for future frequency analysis making use of the IBM 083 sorter.

Questions designed to measure knowledge and attitudes were assigned numerical scores. Knowledge scores were based on the relative importance of the question. Correct answers had values ranging from 2 to 15.

Attitude scores were weighed within the framework of Likert (56) International Summated Scale. Each attitude general and attitude government question was weighed from 0 to 10 points. The 10 value represented a highly favorable attitude, 5 was undecided and 0 was highly unfavorable. Items fell into one of six categories: (1) strongly approve, (2) approve, (3) undecided, (4) disapprove, (5) strongly disapprove and (6) no opinion or on a modified scale into one of three categories: (1) agree, (2) disagree and (3) no opinion.

The knowledge and attitude questions represented four categories and are keyed by hand in Appendix A with the symbols as listed below:

KG -- Knowledge, General
KGT -- Knowledge, Government
AG -- Attitude, General
AGT -- Attitude, Government

## Statistical Analysis

The statistical analysis used in this sub-study were the chi-square ($X^2$) and the student t-test. The chi-square test was used to determine if a significant difference existed between the educational levels of middle and upper-middle income class urban dwellers from Richmond and from Roanoke, Virginia. The chi-square (42) formula for testing agreement between observed and expected results is stated as follows:

$$X^2 = \left( \frac{(fo - fe)^2}{fe} \right)$$

Chi-square equals the sum of frequency observed minus frequency expected, squared, divided by frequency expected.

Degrees of freedom (df) were determined by the following formula: (row - 1) (column - 1). Chi-square values were read along the appropriate row of a chi-square table.

The student t-test was used to determine if a significant difference existed between the benchmark values of the middle and upper-middle income class urban dwellers from Richmond and from Roanoke, Virginia. The student t (42) formula for testing the significant difference between two population sample means is stated as follows:

$$t = \left( \frac{m - m\ pop}{Sm} \right)$$

Student t equals the sample mean (m) minus the mean of the other population (m pop) divided by the standard error of the sample mean. Student t-values were compared with the 0.05 level of significance in the student t-table.

# CHAPTER IV

## RESULTS AND DISCUSSION

This chapter reports the findings of the data in this substudy and relates these findings whenever possible to the findings of other published information. These results describe the level of knowledge and the attitudes of middle and upper-middle income class urban dwellers toward chemical pesticides. Numerical values obtained from the respondents' replies to knowledge and attitude questions were considered to represent benchmarks, Four kinds of benchmarks were obtained from four categories; Knowledge General, KG, Knowledge Government, KGT, Attitude General, AG, and Attitude Government, AGT.

### Benchmarks

The IBM 7040 and 1401 computers were programed to establish a numerical score for each respondent in each of the four knowledge and attitude categories. The scores in each category were averaged to provide a population mean, designated as a benchmark. These observed benchmarks were compared with a total attainable score. Table I summarizes these data.

## TABLE I

## BENCHMARK LEVELS OF KNOWLEDGE AND ATTITUDES OF THE COMBINED ROANOKE AND RICHMOND, VIRGINIA URBAN SAMPLES, JULY-AUGUST, 1966

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Benchmark, Observed | 3.62 | 2.50 | 6.90 | 5.37 |
| Benchmark, Attainable | 5.30 | 7.50 | 10.00 | 10.00 |
| Per Cent Perfect Score | 68.37 | 33.48 | 69.00 | 53.70 |
| N=801 | | | | |

Urban dwellers displayed a high level of general knowledge regarding chemical pesticides. Urban dwellers, as shown by the benchmarks, had a higher score for general knowledge than they had for knowledge of government regulation of pesticides. When viewed from a per cent perfect score basis, urban dwellers had over twice as much general information as they had regarding governmental activities. This high level of knowledge for the general subject of pesticides is similar to the value of 71 per cent found previously among Iowa farmers by Beal et al (7). The lower score for knowledge of government questions agrees with the general statement that Iowa farmers had little knowledge concerning governmental control of pesticides.

Urban dwellers expressed a favorable attitude toward the use of chemical pesticides. They attained a higher benchmark for general attitude than for the attitude, government category.

Respondents with a high knowledge, general score also displayed a similar high attitude, general score, when compared on a per cent perfect score basis. On the other hand, the per cent perfect score for knowledge, government questions proved to be approximately one-third lower than the score for attitude, government questions. This lower score for knowledge, government questions coincides with the statement made by Berlo (10) that the level of knowledge affects ones attitude.

## Profile Characteristics

The level of education for both urbanite groups sampled from Virginia is shown in Figure 1. The mean level of education for the combined populations was 12.5 years. Observation of the histogram indicated that the education level is somewhat skewed toward those respondents who had completed four years of high school or more. Approximately 77 per cent of the 801 urban dwellers questioned had at least four years of high school education. The percentage of respondents at the elementary level essentially equaled the percentage of respondents sampled who received training beyond the college degree. Together these two groups constituted approximately 20 per cent of the population. Respondents at the elementary level contributed less than 10 per cent of the information necessary to form the benchmark. Therefore, one explanation for the fairly high

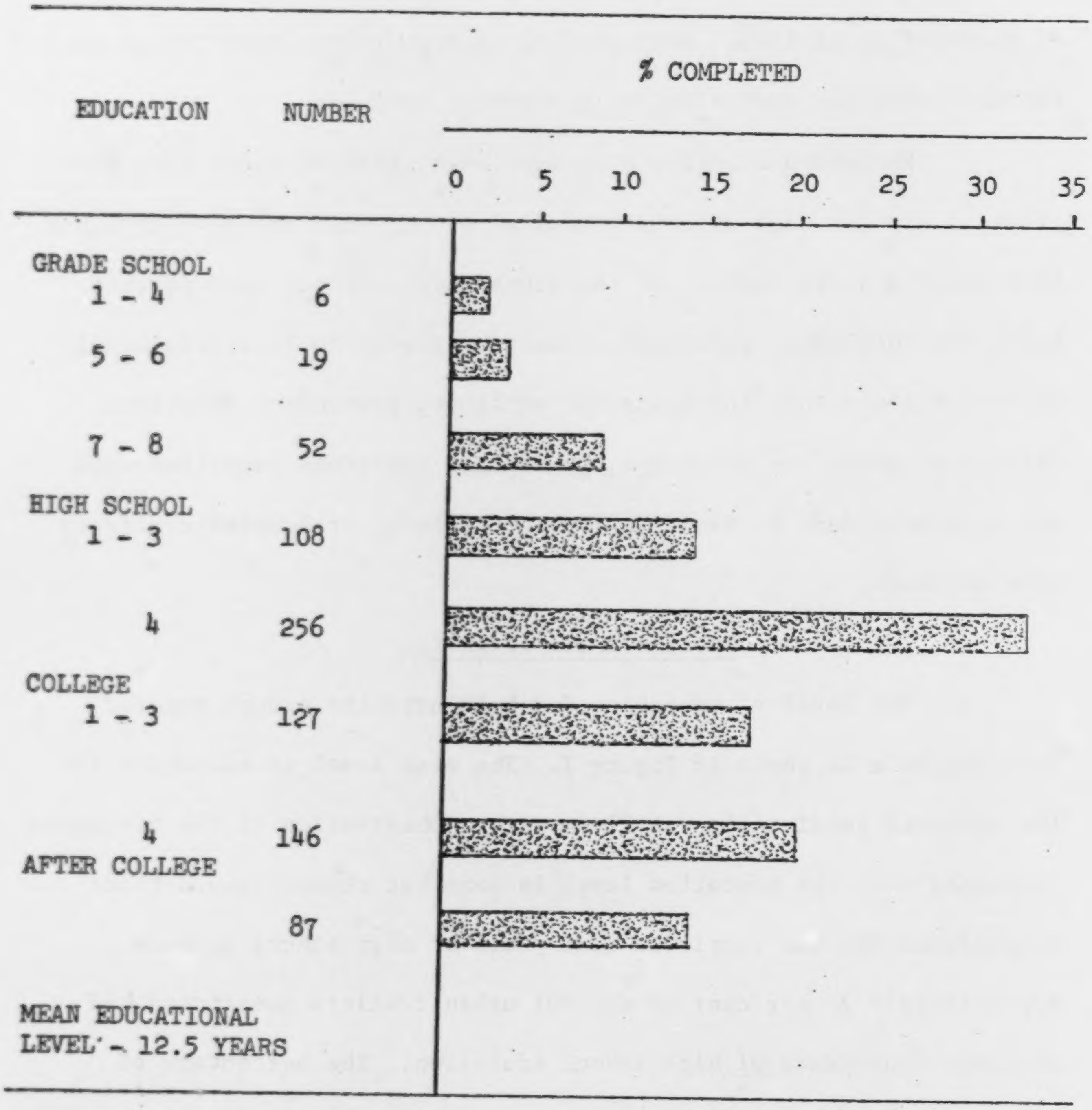

Fig. 1.- Grouped data showing the mean educational level for middle and upper-middle income class urban dwellers from Roanoke and from Richmond, Virginia.

benchmarks for knowledge and attitude general categories could be the high level of education attainment achieved by the urban dwellers. The educational training appeared to be adequate enough to give them a base of knowledge sufficient to answer correctly the general questions about use of chemical pesticides. But this training proved to be slightly low for recognition of special governmental controls concerning the use of chemical pesticides.

The educational levels for urban dwellers from the two populations are compared in Figure 2. There is a significant difference in the educational level for urban dwellers in the two populations as shown by a Chi-square test. This difference between populations is reflected in the greater level of educational training achieved by the respondents from Richmond beyond high school, and this proved to be especially evident in the population who received educational training of four years college or more. The percentage of respondents who had college training represented almost one-half of the Richmond population, whereas they represented about one-third of the Roanoke population. Almost twice as many respondents from the Roanoke population fell into the elementary school level as did those respondents from the Richmond population.

Comparison of the benchmarks for knowledge and for attitude obtained from respondents is shown in Table II.

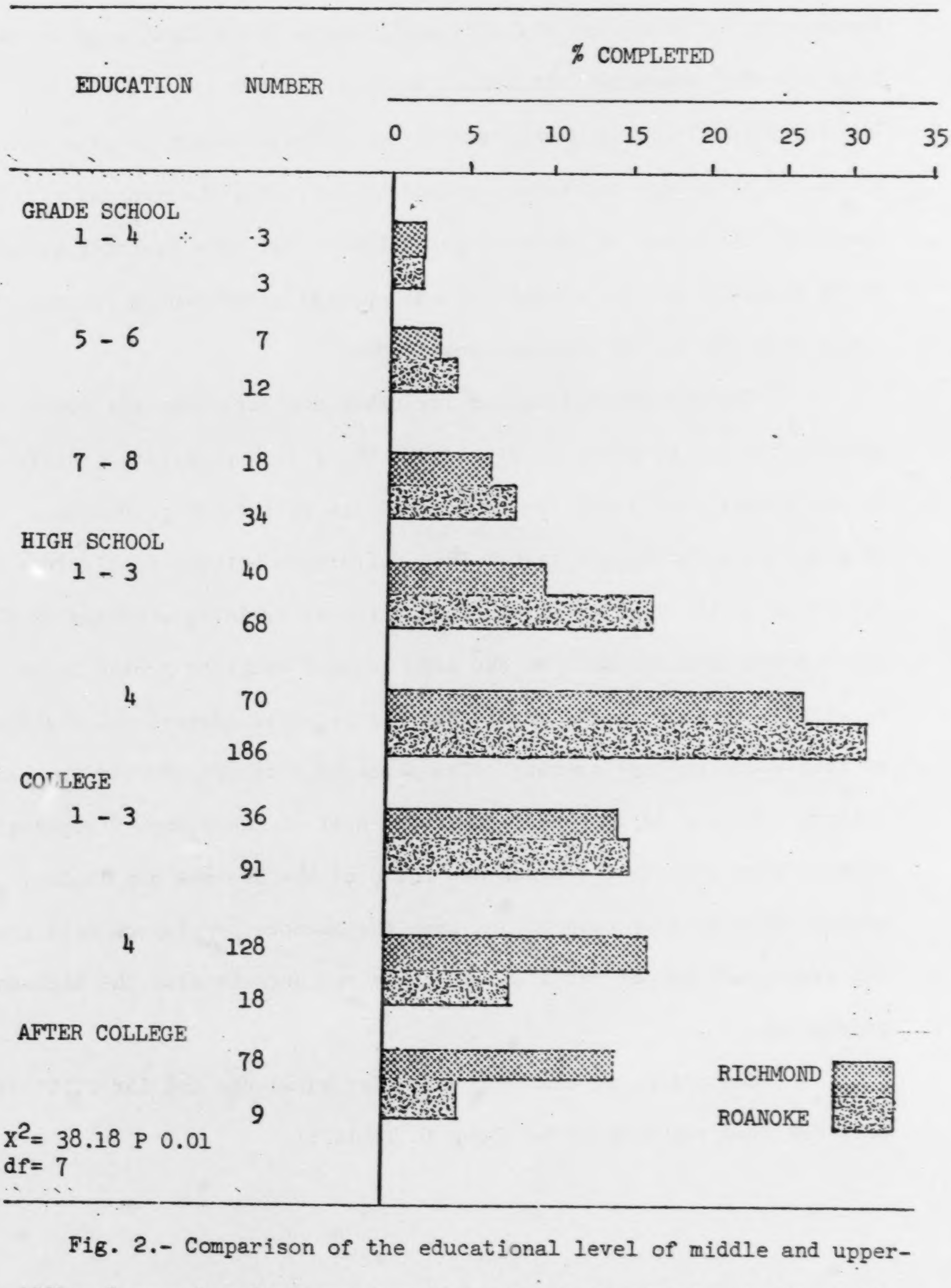

Fig. 2.- Comparison of the educational level of middle and upper-middle class urban dwellers from Roanoke and from Richmond, Virginia.

## TABLE II

## BENCHMARKS OF KNOWLEDGE AND ATTITUDE OF THE SEPARATE ROANOKE AND RICHMOND, VIRGINIA URBAN SAMPLES, JULY-AUGUST, 1966

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Roanoke | 3.59 | 2.50 | 6.89 | 5.29 |
| Richmond | 3.63 | 2.51 | 6.90 | 5.40 |
| | Analysis | | | |
| difference in scores | 0.04 | 0.01 | 0.01 | 0.11 |
| t-value | - 0.51 | - 0.08 | - 0.41 | - 0.59 |
| Significance at 5% level | NS | NS | NS | NS |
| df = 799 (801-2) | | | | |

Results of a student t-test failed to show any significant difference between Roanoke and Richmond in any specific category. The higher level of education attained by respondents from the Richmond population did not seem to provide any significant advantage in questions dealing with either knowledge of or attitude toward chemical pesticides.

Participation of urban dwellers in certain selected organizations is shown in Table III.

TABLE III

URBAN DWELLERS' PARTICIPATION IN SELECTED ORGANIZATIONS

| Organization | Group | |
|---|---|---|
| | Number | Per Cent |
| PTA | 221 | 20.47 |
| Audubon | 2 | 0.21 |
| Garden Club | 37 | 3.87 |
| Rotary | 11 | 0.99 |
| Sportsman Club | 35 | 2.37 |
| Home Demonstration Club | 13 | 1.37 |

Of the 801 urban dwellers sampled, 29 per cent were members of selected organizations. Slightly more than two-thirds of respondents belonged to the PTA. These results indicated that more urban dwellers participated in family organizations than they did in individual organizations. Notably, less than one per cent proved to be members of the Audubon Society, an organization which has opposed use of chemical pesticides. This lack of participation in the Audubon Society doubtlessly contributed to the favorable attitudes of many urban dwellers. The population included few urban dwellers who belonged to Home Demonstration Clubs, an Extension fostered organization. This indicates that the urban dweller's knowledge of chemical pesticides was derived from sources other than participation in Home Demonstration Clubs.

Participation of urban dwellers in special interest activities is shown in Table IV.

The urban dwellers' greater interest in reading books when compared with other activities may have accounted for their higher general knowledge level of chemical pesticides. These more positive attitudes were congruous with more positive attitudes expressed by so many authors of books and journals. Respondents in this sub-study showed a high interest in gardening activities. This observation agreed with the results reported by Dobriner (32) who found a high interest in gardening and similar activities among suburban people. The population's overall interest in raising flowers, flower arranging and vegetable gardening suggested that urban dwellers who garden had a higher general knowledge of and a more favorable attitude toward chemical pesticides than those respondents who did not participate in these activities.

The Extension educator must consider several factors carefully in designing an educational program for this audience. Generally, the respondent was engaged in one or more of these activities. The average individual either read popular literature, typically gardened, fished, swam or engaged in small discussion group activities. One may infer that urban dwellers who participated in these special activities are also well-versed on current issues regarding problems of a personal nature.

## TABLE IV

## URBAN DWELLERS
## PARTICIPATION IN SPECIAL INTEREST ACTIVITIES

| Activity | Group | |
|---|---|---|
| | Number | Per Cent |
| Bird watching | 128 | 15.91 |
| Boating | 190 | 23.52 |
| Camping | 129 | 16.10 |
| Collecting insects | 10 | 1.21 |
| Discussion Groups | 276 | 34.43 |
| Fishing | 308 | 38.41 |
| Flower arranging | 266 | 33.01 |
| Golf | 105 | 13.11 |
| Hiking | 153 | 19.13 |
| Nature study | 109 | 13.62 |
| Raising flowers | 433 | 54.03 |
| Reading books | 577 | 64.52 |
| Swimming | 340 | 42.44 |
| Vegetable gardening | 219 | 27.33 |

Figure 3 shows the age distribution of urban dwellers. The mean age of the combined populations was 49.7 years. As shown by comparison of histograms, the population was skewed to the right in favor of those respondents of middle age or older. The number of urban dwellers sampled in the advanced age category of 70 years or older was only slightly higher than the number of urban dwellers sampled in the middle 20 years of age group. Approximately two per cent of the respondents sampled were from the teen category.

The place of residence of urban dwellers prior to 18 years of age is shown in Figure 4. Three-fifths of these urban dwellers spent their early childhood and early teen years within the metropolitan area. One-fifth of the population lived in farming areas while the remainder lived in small communities or isolated personal domains.

## Selected Questions Contributing to Benchmarks

Fourteen questions or statements were evaluated separately in an attempt to explain the benchmark values. Four were evaluated from each knowledge category; four were evaluated from the attitude general category, and two from attitude government category. These responses were judged to contribute measurably to the benchmarks since they represented the most diversified or varied reaction. Tables for each of these categories are included below.

### Knowledge, General

Table V shows the urban dwellers' interest in the proper use of pesticides.

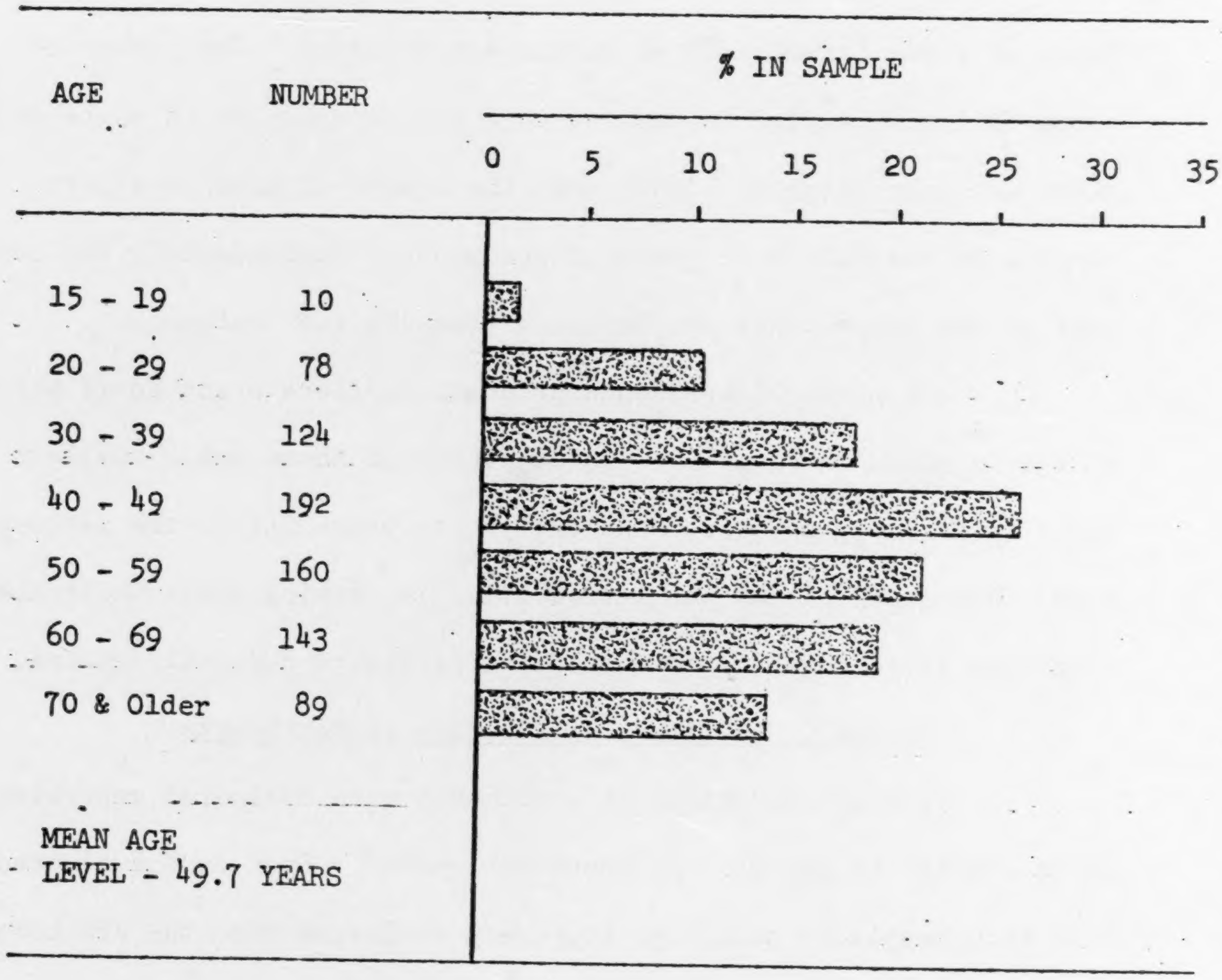

Fig. 3.- Grouped data showing mean age distribution of the middle and upper-middle income class urban dwellers from Roanoke and from Richmond, Virginia.

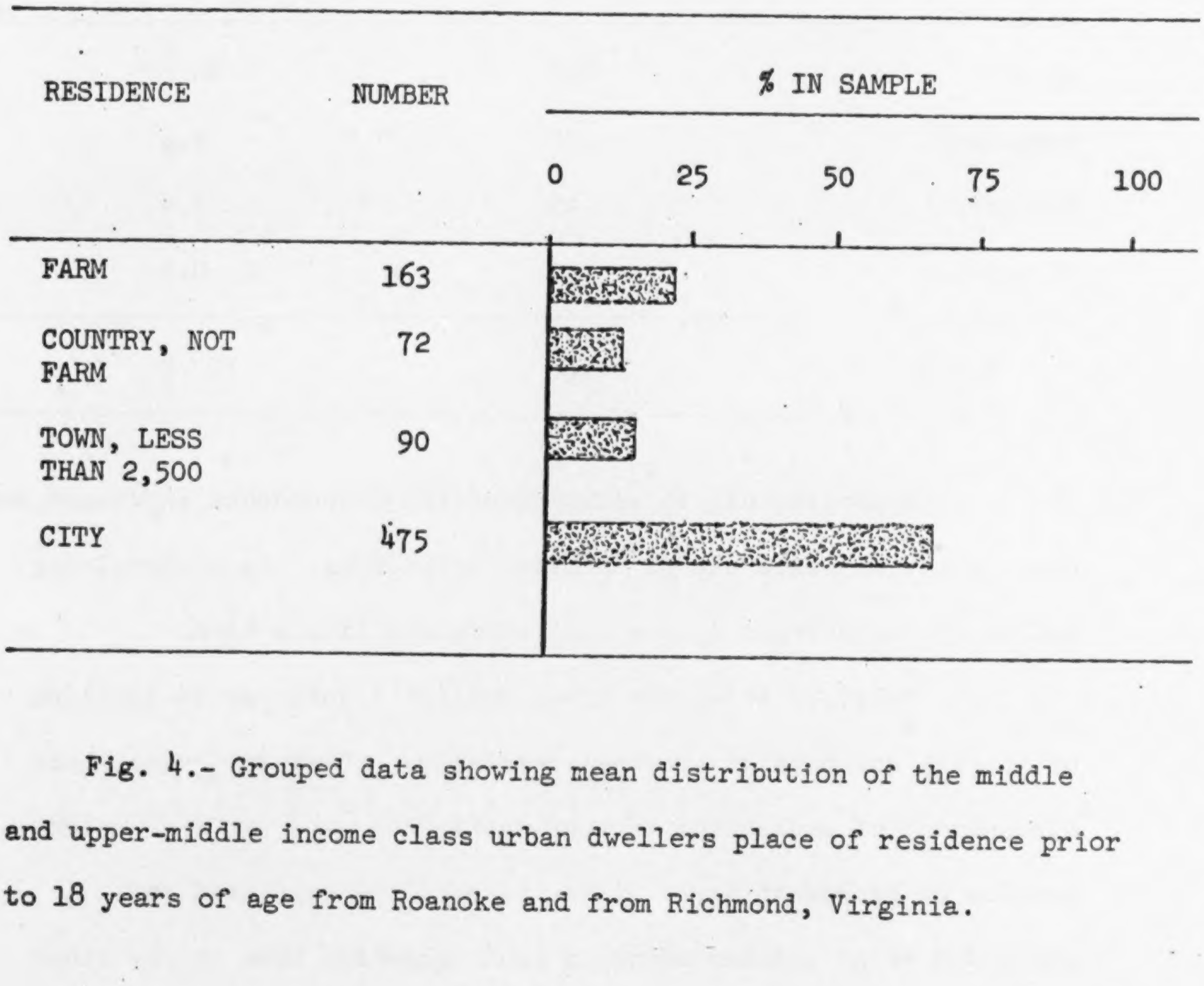

Fig. 4.- Grouped data showing mean distribution of the middle and upper-middle income class urban dwellers place of residence prior to 18 years of age from Roanoke and from Richmond, Virginia.

## TABLE V

## RESPONDENTS' REACTION TO THE STATEMENT: IF PESTICIDES ARE USED PROPERLY, PEOPLE CAN AVOID ANY HARM FROM THEM.

| Response (Correct answer agree) | Number | Per Cent |
|---|---|---|
| Agree | 667 | 84.6 |
| Undecided | 76 | 9.6 |
| Disagree | 43 | 5.4 |
| No opinion | 2 | 0.4 |
| Total | 788 | 100.0 |

Approximately 15 per cent of the respondents expressed some doubt about the safe use of chemical pesticides. An overwhelming number of respondents agreed that there was little harm.

Table VI shows the urban dweller's interest in labeling of bottles and bags of chemical pesticides. Very few respondents disapproved of a practice whereby pesticides were put into unlabeled bottles or packed in bags. Fewer respondents expressed an undecided or no opinion answer to this question than to any other remaining question.

## TABLE VI

## RESPONDENTS' REACTION TO THE STATEMENT: PESTICIDES SHOULD NOT BE PUT IN UNLABELED BOTTLES OR BAGS.

| Response (Correct answer is agree) | Number | Per Cent |
|---|---|---|
| Agree | 768 | 96.2 |
| Undecided | 7 | 0.9 |
| Disagree | 18 | 2.2 |
| No opinion | 6 | 0.7 |
| Total | 799 | 100.0 |

Table VII shows the interest of urban dwellers in the possible danger of chemical pesticide use.

The respondents showed serious interest in the general well-being of animal life. Essentially two-thirds of the urban dwellers had a general feeling of high regard for the possible contamination of wildlife.

### TABLE VII

### RESPONDENTS REACTION TO THE QUESTION: DO YOU FEEL THAT PESTICIDE SPRAYS AND DUST ENDANGER WILDLIFE THAT MAY COME INTO CONTACT WITH THEM?

| Response (Correct answer is yes) | Number | Per Cent |
|---|---|---|
| Yes | 507 | 63.45 |
| No | 180 | 22.53 |
| Do not know | 112 | 14.02 |
| Total | 799 | 100.00 |

Table VIII represents the replies of urban dwellers to the possible dangers to individuals exposed to chemical pesticides.

TABLE VIII

RESPONDENTS' REACTION TO THE QUESTION: DO YOU BELIEVE ANY OF THE FOLLOWING PEOPLE ARE IN ANY DANGER FROM THE USE OF PESTICIDES?

| Response (Correct answers are A and B) | Number | Per Cent |
|---|---|---|
| A. People making pesticides | 221 | 27.59 |
| B. Applicators | 344 | 42.95 |
| C. Food harvesters | 109 | 13.61 |
| D. Retail dealers | 75 | 9.36 |
| E. Consumers who eat food treated with pesticides | 328 | 40.95 |
| F. None is in danger | 239 | 29.84 |

Urban dwellers expressed a strong interest in the notion that people who applied and who ate foods treated with pesticides were in a somewhat more critical position than were those individuals who prepared pesticides and who secured food products. This greater feeling for individuals who eat foods treated with chemical pesticides coincided with the urban dweller's low benchmark for knowledge government. If urban dwellers had known the federal and state governments controlled the levels of chemical pesticide residues in food, presumably they would have answered this question correctly.

Slightly over one-fourth of the respondents saw no danger in the use of pesticides, a figure somewhat surprising and which disagreed slightly with the 46 per cent group of "nonworriers" found among Pennsylvania residents as reported previously by Bealer and Willits (8).

### Knowledge, Government

Table IX shows the replies of urban dwellers to a question of the presence of pesticides in food.

TABLE IX

RESPONDENTS' REACTION TO THE QUESTION: ARE FOODS CHECKED FOR THE PRESENCE OF PESTICIDES BEFORE THEY ARE SOLD?

| Response (Correct answer is "yes") | Number | Per Cent |
|---|---|---|
| Yes | 276 | 34.50 |
| No | 126 | 15.75 |
| Do not know | 398 | 49.75 |
| Total | 792 | 100.00 |

One-third of the respondents actually knew that foods were checked for pesticides before being sold. While the remaining two-thirds expressed little knowledge of this subject, approximately one-half proved to be completely uninformed of this matter.

Table X shows the replies of respondents who knew at least some foods were checked for the presence of pesticides before they were sold.

### TABLE X

### REACTION OF RESPONDENTS WHO ANSWERED "YES" TO THE ABOVE QUESTION WHEN GIVEN THE QUESTION: WHO DOES THE CHECKING?

| Source (Correct answer, both Federal and State Government) | Number | Per Cent |
|---|---|---|
| Federal Government | 195 | 48.86 |
| The store | 26 | 6.52 |
| State Government | 93 | 23.31 |
| Grower | 32 | 8.02 |
| Wholesaler | 14 | 3.51 |
| Other | 10 | 2.51 |
| Did not know | 29 | 7.27 |

Although one-half of these respondents recognized federal control in the checking for presence of pesticides, the weak response in recognition of state control reflected inadequacies in the dissemination of information to the people.

Table XI shows the replies of respondents who knew about the federal controls on chemical pesticides.

### TABLE XI

### RESPONDENTS'REACTION TO THE QUESTION: ARE THERE ANY FEDERAL LAWS CONTROLLING THE AMOUNT OF PESTICIDES THAT MAY BE IN FOOD?

| Response (Correst answer is yes) | Number | Per Cent |
|---|---|---|
| Yes | 121 | 49.39 |
| No | 34 | 13.88 |
| Not sure | 90 | 36.73 |
| Total | 245 | 100.00 |

One-half of the respondents who knew that the amount of pesticide controlled in foods approximated the figure of one-half of respondents who knew the federal government to be involved initially.

Table XII summarizes the answers of respondents who knew that there were federal laws which govern the amount of pesticides that may be in food.

TABLE XII

RESPONDENTS' REACTION TO THE QUESTION: IF THE ANSWER WAS "YES" TO THE ABOVE QUESTION, WHAT ARE THE NAMES OF THE LAWS?

| Names of Laws | Number | Per Cent |
|---|---|---|
| Federal Food, Drug & Cosmetic Act | 4 | 3.30 |
| Insecticide, Fungicide & Rodenticide Act | 3 | 2.48 |
| Total | 7 | 5.78 |

Approximately 94 per cent of the urban dwellers did not know of the Federal Food, Drug and Cosmetic Act and the Insecticide, Fungicide and Rodenticide Act.

Results of the knowledge category indicated that the urban dwellers answered about 30 per cent of the questions correctly. This low benchmark level could be based upon the urban dweller's lack of specific information on government regulations during their educational training or some could have completed their educational training prior to the passage of these laws. Another explanation could be the extremely conservative attitude towards government regulations held by many Virginians.

Attitude, General Questions

Table XIII shows the replies of respondents showing their reaction to the possibility of fear from pesticides.

TABLE XIII

RESPONDENTS' REACTION TO THE STATEMENT:
THERE IS LITTLE REASON TO FEAR PESTICIDES.

| Response (Correct answer is agree) | Number | Per Cent |
|---|---|---|
| Agree | 303 | 37.90 |
| Undecided | 129 | 16.20 |
| Disagree | 345 | 43.20 |
| No opinion | 22 | 2.70 |
| Total | 799 | 100.00 |

Approximately four of five respondents either agreed or disagreed with this statement. Some one-fifth of the urban dwellers appeared to be undecided or had no opinion. Such diversity in response suggested a general lack of concern or a lack of information on consumers' fear of pesticides.

Table XIV shows the urban dwellers' feeling about the use of pesticides for control of pests.

TABLE XIV

RESPONDENTS' REACTION TO THE STATEMENT: THE USE OF PESTICIDES HAS DONE LITTLE TO CONTROL THE SPREAD OF PESTS.

| Response (Correct answer is disagree) | Number | Per Cent |
|---|---|---|
| Agree | 86 | 10.80 |
| Undecided | 63 | 7.80 |
| Disagree | 633 | 79.30 |
| No opinion | 16 | 2.10 |
| Total | 799 | 100.00 |

The majority of respondents recognized the value of pesticides for control of pests, while one-tenth of them assumed that they had little value from a control standpoint.

TableXV shows the attitude of urban dwellers concerning farmers need to employ pesticides for keeping an abundant food supply.

### TABLE XV

### RESPONDENTS' REACTION TO THE STATEMENT: IN ORDER TO CONTINUE TO PRODUCE AN ABUNDANT FOOD SUPPLY, FARMERS MUST USE PESTICIDES.

| Response (Correct answer is agree) | Number | Per Cent |
|---|---|---|
| Agree | 652 | 81.60 |
| Undecided | 62 | 7.70 |
| Disagree | 67 | 8.50 |
| No opinion | 18 | 2.20 |
| Total | 799 | 100.00 |

Table XVI represents an expression of attitude on public health and happiness in an environment free of pesticides.

TABLE XVI

RESPONDENTS' REACTION TO THE STATEMENT:
IF PESTICIDES WERE NOT USED, PEOPLE
WOULD BE HEALTHIER AND HAPPIER.

| Response (Correct answer is disagree) | Number | Per Cent |
|---|---|---|
| Agree | 92 | 11.50 |
| Undecided | 163 | 20.50 |
| Disagree | 511 | 64.00 |
| No opinion | 32 | 4.00 |
| Total | 800 | 100.00 |

Two-thirds of the respondents disagreed with the statement and, few agreed with it.

There appeared to be two kinds of responses of urban dwellers to this set of attitude general questions. Collectively, the urban dweller's attitude to the use of chemical pesticides was favorable as shown by the high benchmark for this category. However, the other kind of response appeared to represent a mixed feeling whereby urban dwellers probably lacked sufficient information to pass a favorable judgement.

Attitude, Government Questions

Table XVII presents the attitudes of urban dwellers to governmental assistance in combating hazards from pesticides.

TABLE XVII

RESPONDENTS' REACTION TO THE QUESTION:
DO YOU BELIEVE THAT THE GOVERNMENT IS DOING
ALL IT CAN TO ADEQUATELY PROTECT YOU
FROM POSSIBLE POISONING BY PESTICIDES?

| Response (Correct answer is no or do not know) | Number | Per Cent |
|---|---|---|
| Yes | 418 | 52.50 |
| No | 176 | 22.00 |
| Do not know | 203 | 25.50 |
| Total | 797 | 100.00 |

Two-thirds of the urban dwellers had the attitude of an adequate governmental control, while the remaining one-third expressed some doubt or had a negative opinion. The incorrect responses to this question coincide closely with the low benchmark for knowledge government obtained by the urban dwellers. If the urban dwellers had known about government regulation of chemical pesticide use, presumably they would have responded negatively to the statement that the government is doing all it can to protect them from chemical pesticide poisoning.

Table XVIII shows the response of urban dwellers to the possibility of the sale of pesticides on a prescription basis.

TABLE XVIII

RESPONDENTS' REACTION TO THE QUESTION:
DO YOU THINK THAT CERTAIN PESTICIDES
SHOULD BE AVAILABLE ONLY ON A PRESCRIPTION
BASIS, LIKE MANY MEDICINAL DRUGS FOR PEOPLE?

| Response (Correct answer is yes) | Number | Per Cent |
|---|---|---|
| Yes | 370 | 46.31 |
| No | 326 | 40.55 |
| No opinion | 105 | 13.14 |
| Total | 801 | 100.00 |

Slightly less than one-half of the urban dwellers thought this would be of benefit, but the strong negative expression indicated that urban dwellers felt that there should be some degree of freedom in pesticide disposition.

The results dealing with attitude government questions represented the most mixed expression of feelings found in the sub-study. One-half of the urban dwellers had an attitude of well-being regarding governmental assistance with pesticides; an equal number responded unfavorably. Several factors could account for the mixed expression: a) lack of information, (b) insufficient interest or motivation to use chemical pesticides, (c) conservative attitude toward government controls, (d) peer groups, feelings and opinions about the use of chemical pesticides, (e) lack of experience in using chemical pesticides, (f) intelligence level, and (g) educational level.

# CHAPTER V

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

### Summary

With the shift from a rural society to an urban society, the Cooperative Extension educator has found it necessary to access the knowledge and attitudes of the urban consumer. Recently, urban dwellers became alarmed by the release of Silent Spring, and similar publications, which pointed to the possible noxious effects from chemical pesticide residues. This sudden interest by the public prompted President Kennedy to appoint a panel on the use of pesticides to function as part of the governmental Scientific Advisory Committee. The purpose of this panel was to study the role of chemical pesticides on the health of man and other animals. The report by this panel and later Senate hearings led by Abraham Ribicoff ultimately led to the release of financial appropriation to the United States Department of Agriculture for the study of and control of chemical pesticides in the environment. In addition, Congress allocated funds to the Federal Extension Service of the U. S. Department of Agriculture for the purpose of educating the general public on the safe and effective use of chemical pesticides.

The urban dweller became part of this comprehensive program established by the FES because it was mandatory for the general public to become aware of the vital nature of chemical pesticides for maintenance of an adequate food supply. Since the FES had little information about what urban dwellers thought about chemical pesticides, it was desirable to find out what the urban dweller knew about chemical pesticides and what attitudes they possessed about their application. The present sub-study represented one facet of an overall study designed by the Extension Service of the Virginia Polytechnic Institute to investigate "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemical Pesticides." The present sub-study specifically emphasized the present level of knowledge and current attitude of middle and upper-middle class urban dwellers toward the use of chemical pesticides in Virginia.

Urban dwellers of Virginia form a major component of the general public who must be educated on the safe and effective use of chemical pesticides. Such an educational program has been planned and will be implemented by the Virginia Polytechnic Institute Cooperative Extension Service. Before a meaningful program could be planned, general and specific information had to be obtained from the urban dwellers who had past experience or who lacked experience with chemical pesticides. The determination of knowledge and attitude benchmarks provided a basis for further comparison, once behavioral changes could be induced by the planned educational program.

Specific objectives followed in this sub-study were:

1) To determine the knowledge and attitude of middle and upper-middle income groups of urban dwellers regarding chemical pesticides.

2) To determine if a significant relationship existed between attitude, knowledge and certain selected profile characteristics of these urban dwellers.

3) To establish guideposts to aid in future development of

effective programs designed by the Cooperative Extension educator for the urban dweller.

Sampling of the population involved 801 personal interviews made in a pre-treatment analysis performed in the cities of Roanoke and Richmond, Virginia. The plan of analysis was scientifically designed to fit a statistically randomized program which had been developed by professional consultants. The instrument of observation was a personal interview questionnaire. The questionnaire as well as the schedule for interviewing was designed by the Virginia Cooperative Extension Service in cooperation with a private evaluation consultant service. Data were analyzed by means of frequency distribution, percentage, Chi-square and student t-test.

The fairly high benchmark for general knowledge of chemical pesticides showed that the urban dweller had been fairly well informed by exposure to sources of reliable information. The low benchmark score for governmental control of chemical pesticides may have resulted from a generally conservative attitude on the part of the respondents. Such differences for general and government knowledge categories agreed with the sociological construct that exposure to new information can change ones level of knowledge, but acceptance will not always occur because attitudes, feelings and emotions may block any opportunity for change.

The mean educational level of respondents proved to be 12.5 years. Approximately 77 per cent of the urban dwellers questioned had at least four years of high school education. Urban dwellers from Richmond showed a significantly higher level of education than did urban dwellers from Roanoke, Virginia. However, differences in educational levels were not reflected in benchmark scores for these two groups of urban dwellers. One possible explanation for the lack of a difference was that the educational level of both groups proved to be fairly high and the questions were of such general nature that this could negate any possibility of revealing major differences between the two groups. For both groups, the knowledge level seemed to be intimately associated with the degree of educational training. This was evidenced by the high benchmark score obtained by urban dwellers whose educational level was also high. The lower level of information held by urban dwellers regarding knowledge government must be viewed lightly when relating this to educational level since specific governmental laws usually would be omitted in a broadly defined educational program. In addition, the urban dweller could have been trained prior to the passage of these laws. Recognition of an education, and knowledge relationship was documented throughout the review of literature.

The past experiences of urban dwellers with general use of chemical pesticides were reflected primarily in responses by the majority of respondents who realized little harm would come from proper use of chemical pesticides. The previous exposure to a topic, product or label which expressed value in chemical pesticide use would contribute measurably to one's knowledge assessed by the benchmark scores on knowledge general.

In spite of the general notion that urban dwellers might obtain considerable information about chemical pesticides through civic activities, this relationship did not appear to be as outstanding as generally thought. Instead, information obtained in the form of reading material seemed to provide a much greater source for recognition of chemical pesticides. Only 29 per cent of the respondents belonged to civic organizations, while nearly 65 per cent claimed to have secured knowledge via published literature. This dissimilarity would tend to detract slightly from an immediate social environmental influence, with the exception of the family. However, the high percentage of individuals who read books still predominated within this social class.

Some interpretation of self-concept image was realized by the large percentage of respondents who answered one specific question incorrectly. Approximately 40 per cent of the respondents who answered "Who was in the most danger from the use of chemical pesticides?" were so interested in how chemical pesticides affected them, they failed to reply correctly. When the correct response should have been producers and applicators of chemical pesticides, they answered the consumers who ate foods treated with chemical pesticides were in the most danger. The self-image concept seemed to be expressed also by the active participation of dwellers in special interest areas.

Respondents who had a high benchmark for knowledge general also displayed a similarly favorable attitude toward chemical pesticides. Respondents who displayed a low benchmark for government knowledge also showed a less favorable benchmark for attitude government. This consistency in both instances suggested that attitude is shaped by the level of information possessed by the urban dweller.

Certain inferences with respect to personality could be made from the diverse results obtained on selected attitude general questions. A positive attitude could be interpreted by the majority of respondents who recognized value in use of chemical pesticides. Some four-fifths of the respondents expressed that chemical pesticides were needed for maintenance of an adequate food supply. A somewhat mixed attitude could be interpreted from those respondents in the 40 per cent category who replied unfavorably concerning fear of chemical pesticides. A negative attitude could be viewed by one-tenth of the respondents who agreed that health and happiness would be greater in an environment free of chemical pesticides.

Urban dwellers were consistently in favor of general use of chemical pesticides and consistently against governmental control of chemical pesticides. This agreed with the sociological expression that a consistent attitude tends to be stable and that cognitive components support each other.

The degree of congruity in attitude was evidenced by the fact that more than one-half of the urban dwellers expressed a favorable attitude that the government was doing enough about chemical pesticide control. But a distinctly favorable attitude should have reflected disagreement with this statement. According to the sociological interpretation, this incongruity of changing to a more positive outlook will be difficult to change. Some 20 per cent of the urban dwellers were undecided whether people would be healthier and happier without chemical pesticides. This suggested a segment of individuals somewhere in the middle of the congruity continum. Hence, their attitudes should be easily influenced by further training.

Over 80 per cent of the respondents strongly agreed that farmers must use chemical pesticides to maintain an abundant food supply. A similar extremeness in attitude was obvious from the responses by 79 per cent of the urban dwellers who disagreed with the statement that use of chemical pesticides had done little to control the spread of pests.

Three-fifths of the urban dwellers spent early childhood and early teen years in urban communities. This early city life agreed with the general assumption expressed by at least one authority that urbanites had little knowledge of Cooperative Extension work. The lack of any significant difference between place of residence of these two groups of urban dwellers coincided with results which showed a lack of association between place of residence in "worriers" and "nonworriers" from Pennsylvania.

The mean age for urban dwellers was 49.7 years. This older age level could be interpreted as one possible reason for their more conservative attitude toward governmental control of chemical pesticides. The higher age level suggested this income class urbanite was a secure, self-sufficient individual who formed a well-established segment of the population.

## Conclusions

The urban dwellers attitude toward governmental control of chemical pesticides was equally distributed with positive and negative responses. There appears to be an opportunity for changing the urban dwellers attitude to a more positive feeling toward governmental control of chemical pesticides. The Extension educator would need to begin with this objective and, since knowledge of government activity was exceptionally low, this general area of government would seem to represent an initial educational input by the Extension Service.

Even though urban dwellers received a fairly high score for knowledge, general, there were several areas of indecision or evidences of a lack of information. Approximately 30 per cent of the information in this category was answered incorrectly, which indicates a need for further training of these urban dwellers.

The urban dwellers knew no more than one-third of the information concerning federal control and regulations of chemical pesticides. This lack of information shows that an urban extension directed educational program is necessary to inform urban dwellers of chemical pesticide control. An extension educational program on the use of chemical pesticides should begin with information on government control and should be based on data obtained from benchmark studies.

The similarity of benchmark values for both knowledge, general and attitude, general and for knowledge, government and attitude, government seems to indicate that the level of knowledge held by the urban dweller influenced his attitude. The mean age level of the population was 49.7 years. The mean educational level for the total population was high at 12.5 years. There was a significant difference between the educational level of Richmond and Roanoke urban dwellers. However, there was no significant difference between the benchmark value of the two populations. Conclusively, it would appear that if the educational level of a combined population (two urban areas) is initially high, it is less than probable that the benchmarks will be significantly different when the two areas are compared even if there is a significant difference in the educational levels of the two locations.

A three-fifths majority of the urban dwellers had spent the first 18 years of life in a metropolitan area.

About one-third of the urban dwellers were members of selected organizations, while many were interested in certain personal special interest activities. Three-fourths of the urban dwellers read books, one-half were interested in gardening, one-third swam, one-third fished and one-fourth were interested in discussion groups. Conclusively, the urban dwellers participated more in personal special interest activities than in organizations.

## Guidepost for Extension Educational Programs Suitable for Urban Areas

The third objective of this sub-study was to establish guideposts which could be implemented effectively in most any discipline of Extension educational programs involving middle and upper-middle class urban dwellers. Such guideposts should therefore be necessarily based on similar analyses of data, results, and conclusions as described in this study. The following major guideposts seemed plausible for this audience:

1) An effective extension educational program should begin a benchmark analysis or determination of the behavioral level possessed by the urban audience before any teaching is planned or implemented.

2) The Cooperative Extension educator should obtain all available profile data on the urban audience for whom an educational

program is being planned. Such data would include educational level, age, sex, socio-economic class, membership in organizations, residence, former residence, and special interest activities, as well as wants and needs. This knowledge about urban audiences should be utilized by the Cooperative Extension educator in designing and implementing a teaching plan directed at changing human behavior.

3) Since the urban dweller has little knowledge of Cooperative Extension Service, any effective program must begin by acquainting the urban dweller with the educational services available through the Extension Division of the Land-Grant University.

4) The urban dwellers' interest in special interest activities such as reading would indicate the need for an effective Extension educational program to begin with a newsletter series rather than a series of classes.

5) The higher educational level of the middle and upper-middle income class urban dweller suggests the need for a more sophisticated approach to extension programming. One-shot meetings or stocastic approaches of educational programming will not be as effective with this audience. A series of classes based on their special interest, educational level with sequential learning activities would be more feasible for these urban dwellers.

6) While consideration of the educational level is important in programming for this urban audience, it is misleading to assume that this group possesses a wealth of knowledge. This simply indicates that the group will be more receptive, highly motivated and

a educatable audience. Programs designed for this audience require more up-to-date research knowledge designed to meet their real world problems.

## Recommendations for Further Study

The author recommends additional sub-studies which will provide more empirical results concerning the middle and upper-middle class urban dweller.

1) A comparative sub-study to determine differences in benchmark values among age groups, educational level, participation in certain organizations, special interest activities and residence before 18 years of age.

2) A comparative sub-study to ascertain if a relationship exists between the benchmark values and sources of information.

3) A comprehensive study to determine the effect of the middle and upper-middle income urban dweller's "self concept" on his interpretation of new knowledge or information.

An obvious need for research outside the primary study is a study on the effects of "opinion leadership" with knowledge and attitudes of the middle and upper-middle income class urban dweller. Research also is needed in determining the effectiveness of present Extension teaching methods with this segment of the population.

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# APPENDIX A

Va. Coop. Extension Service
Virginia Polytechnic Institute

1500

Budget Bureau No: 40-6673
Approval Expires: Dec. 31, 1966

Summer 1965

Address of respondent ______________________________

Date of interview ________________ Interviewer's name ________________

CHEMICAL-PESTICIDE STUDY

I am representing the College of Agriculture of Virginia Polytechnic Institute which is making a study of the interests and needs of the people of Virginia in the use of pesticides on the farm, in the yard, and in the home.

When I say pesticides, I mean chemicals that are used to kill pests such as insects, weeds, plant diseases, rats, and mice.

1. Have you, yourself, ever used any pesticide? Yes (1) ☐ No (2) ☐

IF NO, SKIP TO INTRODUCTION TO QUESTION 3.

IF YES, ASK:

1a. To kill weeds? .............................. Yes (1) ☐ No (2) ☐

1b. To kill insects inside the house? ............ Yes (1) ☐ No (2) ☐

1c. To kill insects outside, on the lawn, in flowers, on vegetable garden? .................................... Yes (1) ☐ No (2) ☐

1d. To kill mice or rats? ........................ Yes (1) ☐ No (2) ☐

1e. To control plant diseases such as black spot on roses? ............................ Yes (1) ☐ No (2) ☐

IF YES TO 1a. ASK:

2. How often would you say you use weed killer? CHECK ONE

Less than once a year ......................... (1) ☐

Once or twice a year ......................... (2) ☐

Once a month during the growing season ....... (3) ☐

More than once a month during growing season ...................................... (4) ☐

IF YES TO 1c. ASK:

2a. How often would you say you use insect killers outside the house? CHECK ONE

Less than once a year ........................ (1) ☐
Once or twice a year ........................ (2) ☐
Once a month during the growing season ....... (3) ☐
More than once a month during growing season .................................... (4) ☐

As you perhaps know, farmers and public health workers use pesticides to control and destroy the weeds and insects that attack plants, animals, and people. Some people have expressed concern over the possible dangers of the use of such pesticides.

3. Have you ever seen this matter - possible dangers of the use of pesticides - discussed on T.V.?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

4. Have you ever heard this matter discussed on the radio?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

5. Have you ever read about it in magazines or books?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

6. Have you ever discussed it with relatives or members of the family?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

7. Did your friends ever bring this subject up in a conversation?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

8. Have you ever attended a group meeting where such a concern was the topic of discussion?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

9. KGT Are foods checked for the presence of pesticides before they are sold?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

IF NO OR DON'T KNOW - SKIP TO QUESTION 10.

IF YES, ASK:

9a. KGT You mean all foods? ..........................(1) ☐

Or some foods? ...............................(2) ☐

9b. KGT Will you look at this card (A) and tell me who from this list does the checking?

CHECK ALL THAT APPLY.

1. Grower .............. ☐
2. Federal Government .. ☐
3. The store ........... ☐
4. State government .... ☐
5. Wholesaler .............. ☐
6. Other (Specify) ____________
7. Don't know .............. ☐

IF YES TO FEDERAL GOVERNMENT, ASK:

9c. KGT Do you know which department or agency in the Federal Government is responsible for doing the checking?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9d. KGT Which ones?

USDA (1) ☐ HEW (FDA) (2) ☐ Other (3) ☐

IF YES TO STATE GOVERNMENT, ASK:

9e. KGT Do you know which Department or agency in the State Government is responsible for doing the checking?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9f. KGT Which ones?

Virginia Dept. of Agr. ☐ Others ☐

9g. KGT Are there any Federal laws controlling the amount of pesticides that may be in food?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9h. KGT What are the names of the laws?

________________________________________________________

________________________________________________________

________________________________________________________

10. AGT Do you believe that the government is doing all it can to adequately protect you from possible poisoning by pesticides?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

11. KGT Will you look at this card (B) and tell me which of the items you believe to be correct?

Federal government control of pesticides includes:

a. Direct supervision of pesticide manufacturing and packaging plants .................................. ☐
b. Allowing sale only if pesticide can be used safely .................................................. ☐
c. Allowing sale only if pesticide does what the manufacturer says it will .......................... ☐
d. Permitting sale of the most poisonous pesticides only to farmers .................................. ☐
e. Control of statements on pesticide label ................ ☐
f. Setting retail prices of pesticides ..................... ☐
g. Don't know ............................................... ☐
h. No control ............................................... ☐

IF g. OR h. IS CHECKED, SKIP TO QUESTION 13.

12. Will you look at this card (C) and tell me which of these things the Government should do?
ACT

CHECK ONLY ONE

- Remove all controls on the use of pesticides ............ (1) ☐
- Remove some controls on the use of pesticides ........... (2) ☐
- Leave all controls as they are ......................... (3) ☐
- Put some more controls on the use of pesticides .......... (4) ☐
- Put a lot more control on the use of pesticides .......... (5) ☐
- Don't know ............................................ (6) ☐

13. Do manufacturers warn users when their pesticide is poisonous?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

IF YES, ASK:

13a. When they do warn users, how do they do it?

On the label (1) ☐ Other (2) ☐ Don't know (3) ☐

IF THE RESPONDENT ANSWERED NO TO QUESTION 1 ON PAGE 1 (NEVER USED ANY PESTICIDES) NOW SKIP TO QUESTION 25.

14. When you use a pesticide which you have used before, do you read the label, or do you remember how to use it without reading it again?

Read (1) ☐ Remember how (2) ☐ Other (3) ☐

15. Are there any particular directions on labels you can't understand or follow?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES, ASK:

15a. Can you tell me what some of them are?

________________________________________

________________________________________

________________________________________

16. Do you happen to know what word is used to describe the amount of pesticide allowable by law in food or food products?

Tolerance (1) ☐ Other answer (2) ☐ Don't know (3) ☐

17. Where do you keep pesticides when you are not using them?

CHECK AS MANY AS APPLY

a. In the garage ............ ☐

b. In a garden tool shed ..... ☐

c. In the kitchen ........... ☐

d. In the basement ....... ☐

e. Other (Specify) ____________

18. Would you say that all, most, some, or none are stored out of reach of children or pets?

All (1) ☐ Most (2) ☐ Some (3) ☐ None (4) ☐

19. Are all, most, some, or none stored under lock and key?

All (1) ☐ Most (2) ☐ Some (3) ☐ None (4) ☐

20. Have you ever used aerosol bombs containing pesticides?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 21

IF YES, ASK:

20a. What do you do with them when they are empty? CHECK AS MANY AS APPLY

a. Throw in trash pick-up ........................ ☐

b. Burn ........................................ ☐

c. Throw away .................................. ☐

d. Bury ........................................ ☐

e. Other (Specify) ______________________________

21. What do you do with empty containers of pesticides other than aerosol bombs? CHECK AS MANY AS APPLY

a. Burn, if paper bag .......................... ☐

b. Throw in trash pick-up ...................... ☐

c. Bury ........................................ ☐

d. If bottles, wash and use for storage of other liquids ..................... ☐

e. Other (Specify) ______________________________

f. Don't use ................................... ☐

22. What do you do with left-over pesticide spray material?
CHECK AS MANY AS APPLY

- a. Dump on ground ........................................ ☐
- b. Leave in sprayer for next time ........................ ☐
- c. Pour down drain ........................................ ☐
- d. Keep in a container, but not in sprayer ............... ☐
- e. Don't have any left over - make just what is needed ........................................ ☐
- f. Other (Specify) ________________________
- g. Have never used a pesticide in a sprayer .............. ☐

23. Will you look at this card (D) and tell me which of these ways help you decide which pesticide to buy? CHECK AS MANY AS APPLY

- a. Advertisement:
  - (a) In newspaper ................................ ☐
  - (b) On TV ....................................... ☐
  - (c) On radio .................................... ☐
  - (d) In magazine ................................. ☐
- b. Ask a friend ........................................... ☐
- c. Ask the Extension agent (county agent) ................ ☐
- d. Ask the storekeeper or clerk .......................... ☐
- e. Ask a nurseryman ...................................... ☐
- f. Ask V.P.I. (Va. Tech) ................................. ☐
- g. Ask the State Department of Agriculture ............... ☐
- h. Look through the various pesticides on the shelf at the store ........................... ☐
- i. Read about the correct pesticide in a book, magazine, or recommendation sheet .............. ☐
- j. Use the one I have used for years ..................... ☐
- k. Family member told me what to buy ..................... ☐
- l. Other (Specify) ________________________
- m. I don't buy them ...................................... ☐

24. Will you look at this card (E) and tell me which of these methods you use to find out how to use a pesticide? CHECK AS MANY AS APPLY

- a. Ask a friend .......................................... ☐
- b. Recall what I have read about it ..................... ☐
- c. Read the instructions printed on the package ......... ☐
- d. Ask the person who sold it to me ..................... ☐
- e. Ask the county agent ................................. ☐
- f. Ask a nurseryman ..................................... ☐
- g. Look in bulletin or article I have seen about the pesticide ................................ ☐
- h. Ask a family member .................................. ☐
- i. Other (Specify) ________________________________________

25. I have some books listed here. As I name each one, will you tell me whether you have heard of it, whether you have read it, and whether it discusses pesticides?

| | Heard of? | Read? | Discusses Pesticides? |
|---|---|---|---|
| a. DEERSLAYER by James Fenimore Cooper ........... | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐<br>DK (3) ☐ |
| b. SILENT SPRING by Rachel Carson .......... | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐<br>DK (3) ☐ |
| c. TO KILL A MOCKINGBIRD by Harper Lee ....... | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐<br>DK (3) ☐ |
| d. BUGS OR PEOPLE? by Wheeler McMillen ......... | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐ | Yes (1) ☐<br>No (2) ☐<br>DK (3) ☐ |

26. AG What effect do you think the use of pesticides has on the quality of foods produced: Improves quality, lowers quality, or has no effect?

Improves quality ................................ (1) ☐
No effect ....................................... (2) ☐
Lowers quality .................................. (3) ☐
Improves some, lowers others .................... (4) ☐
Don't know ...................................... (5) ☐

27. AG I have a short list of items here. As I read each one, will you tell me whether you think it is one of the results of the use of pesticides?

| | Yes (1) | No (2) | Don't know (3) |
|---|---|---|---|
| a. Control of malarial mosquitoes .............. | ☐ | ☐ | ☐ |
| b. Reduction of amount of sleeping sickness (equine encephalitis) ..... | ☐ | ☐ | ☐ |
| c. Reduction of the number of fish in some places or areas .................... | ☐ | ☐ | ☐ |
| d. Control of fleas and flies that carry disease ............. | ☐ | ☐ | ☐ |
| e. Reduction in the number of birds ........... | ☐ | ☐ | ☐ |

28. Will you look at all the items on this card (F), and then tell me which you think are the most significant or important effects of pesticides?
AC

DO NOT CHECK ALL - CHECK ONLY MOST IMPORTANT

a. Kill ants ☐
b. Protect apples from insects ☐
c. Kill harmful bugs on food crops ☐
d. Kill bugs on roses ☐
e. Harm children and pets ☐
f. Kill fish ☐
g. Kill mosquitoes ☐
h. Upset nature ☐
i. Harm people using them ☐
j. Kill robins ☐
k. Protect shrubs from disease ☐
l. Kill starlings ☐
m. Kill weeds in lawn ☐
n. None is important ☐

29. Will you look at this card (G) and tell me whether you think the use 0
AC of weed killers by farmers helps produce any of the listed results?

CHECK AS MANY AS APPLY;

- a. More food ............... ☐
- b. Less food ............... ☐
- c. More expensive food ..... ☐
- d. Cheaper food ............ ☐
- e. Better food ............ ☐
- f. Food dangerous to eat ............... ☐
- g. None of these .......... ☐
- h. Don't know ............. ☐

30. In general, do you feel pesticides make it easy for a person:

| | | | |
|---|---|---|---|
| a. To control insects or bugs? ............... | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| b. To control weeds? ................. | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| c. To control plant diseases? ........ | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| d. To control rats and mice? ......... | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |

31. Will you look at this card (H)? Do you believe any of these people are
KG in any danger from the use of pesticides?

CHECK AS MANY AS APPLY.

| | QUESTION 31 | QUESTION 31a |
|---|---|---|
| a. The people who make the pesticides ........................ | ☐ | ☐ |
| b. Applicators (farmers or commercial persons who put the pesticides on) ............ | ☐ | ☐ |
| c. Harvesters of food ................. | ☐ | ☐ |
| d. Retail dealers (handlers, salesmen, warehousemen) ........... | ☐ | ☐ |
| e. Consumers who eat food treated with pesticides ........... | ☐ | ☐ |
| f. None is in danger ................. | ☐ | ☐ |

IF MORE THAN ONE WAS CHECKED FOR 31, ASK:

31a. Which one do you believe was exposed to the greatest risk?
KG

CHECK ABOVE

IF b. for 31 (APPLICATORS) WAS NOT CHECKED - SKIP TO QUESTION 33.

32. If a farmer carefully follows the manufacturer's directions for use of pesticides, do you feel there is any danger to him?
KG

Yes (1) ☐ No (2) ☐ Don't Know (3) ☐

IF YES,

32a. Would you say a great deal, some, or a very little?
KG

A great deal (1) ☐ Some (2) ☐ Very little (3) ☐

33. What do you usually do before eating a raw apple or pear? CHECK ONLY ONE

Peel it .................................. (1) ☐

Wash it or rinse it ...................... (2) ☐

Wipe it off ............................. (3) ☐

Nothing ................................. (4) ☐ SKIP TO QUESTION 34.

33a. Why do you do it?

34. Do you think in Richmond/Roanoke there are fewer birds than there used to be, more birds, or about the same number as always?

Fewer birds than there used to be .................... (1) ☐

More birds than there used to be ..................... (2) ☐

About the same number as always ..................... (3) ☐

Don't know ............................................ (4) ☐

IF FEWER, ASK

34a. Why do you think there are fewer?

35. KG Do you feel that pesticide sprays and dusts endanger wildlife that may come into contact with them?

Yes (1) ☐ No (2) ☐ Don't Know (3) ☐

IF YES,

35a. KG Would you say: A great deal, some, very little, or none?

A great deal (1) ☐ Some (2) ☐ Very little (3) ☐

36. I am going to read a number of statements which one might hear concerning pesticides or their use. For each one, as I read it, will you indicate whether you Strongly Agree (SA) with the statement, Agree (A), are Undecided (U), Disagree with it (D), or Strongly Disagree (SD). These responses are listed on this card.

HAND RESPONDENT CARD (I).

Please consider each statement by itself and in its entirety when expressing your opinion.

AG a. In order to continue to produce an abundant supply of food, farmers must use pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG b. If pesticides were not used, people would be healthier and happier.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG c. The use of pesticides has done little to control the spread of pests.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG d. There is little reason to fear pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ Sd (5) ☐

No Opinion (6) ☐

KG e. If pesticides are used properly, people can avoid any harm from them.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

ACT f. Farmers should be allowed to use pesticides as they choose.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG g. If pesticides were not used, the American people might become short of food.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

KG h. There have been deaths due to poor handling of pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

KG i. Pesticides should not be put in unlabeled bottles or bags.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

37. In general, do you feel pesticides are pretty dangerous to work with?

Yes (1) ☐ No (2) ☐ No opinion (3) ☐

38. ACT Do you think that certain pesticides should be available only on a prescription basis, like many medicinal drugs for people?

Yes (1) ☐ No (2) ☐ No opinion (3) ☐

39. I would like to ask you how concerned you think various people or groups are about the possible harmful effects from the use of pesticides.

Here is a card (J) with a listing of degrees of concern that I would like you to use in answering my questions.

HAND CARD TO RESPONDENT AND READ CARD.

| | Not concerned about the effects (1) | A little concerned (2) | Quite concerned (3) | Very much concerned (4) | Don't know (5) |
|---|---|---|---|---|---|
| First of all how concerned are you? ....... | ☐ | ☐ | ☐ | ☐ | ☐ |
| How concerned are: | | | | | |
| The general public ................ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Chemical Manufacturers .......... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Congress .............. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Food & Drug Administration ......... | ☐ | ☐ | ☐ | ☐ | ☐ |
| U.S. Dept. of Agriculture ............ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Va. Dept. of Agriculture ............ | ☐ | ☐ | ☐ | ☐ | ☐ |
| State legislators ...... | ☐ | ☐ | ☐ | ☐ | ☐ |
| V.P.I. (Va. Tech) ...... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Extension agents ....... | ☐ | ☐ | ☐ | ☐ | ☐ |

40. Are the following of serious concern to you?

a. Pollution of the air by smoke .............. Yes (1) ☐ No (2) ☐ No opinion (3) ☐

b. Foreign relations ..... Yes (1) ☐ No (2) ☐ No opinion (3) ☐

c. Contamination from radioactive fallout .............. Yes (1) ☐ No (2) ☐ No opinion (3) ☐

d. Inflation ............ Yes (1) ☐ No (2) ☐ No opinion (3) ☐

e. Pollution of Virginia rivers and streams .... Yes (1) ☐ No (2) ☐ No opinion (3) ☐

We have a few other questions to ask which will provide us with information that will help us tabulate and analyze the data.

DO NOT ASK QUESTION 41

41. Sex:

Male (1) ☐ Female (2) ☐

42. How many children under 15 years of age live here?

CHECK ONE

0 (1) ☐ 1-3 (2) ☐ 4 or more (3) ☐

43. Do you have any pets?

CHECK AS MANY AS APPLY

a. Dogs ............................ ☐

b. Cats ............................ ☐

c. Birds ............................ ☐

d. Fish ............................ ☐

e. Other (Specify) ____________________

f. None ............................ ☐

44. Where did you live most of your life before you were 18? (READ RESPONSES)

On a farm or ranch, ........................................ (1) ☐

In the country but not on a farm, ........................... (2) ☐

In a town under 2,500, or .................................. (3) ☐

In a city? ................................................. (4) ☐

45. What is your occupation? We would like you to be specific.

TELEPHONE LINEMAN, RATHER THAN WORK FOR THE TELEPHONE COMPANY.

________________________________________________________

________________________________________________________

46. What is your age?

15-19 ...................................................... (1) ☐

20-29 ...................................................... (2) ☐

30-39 ...................................................... (3) ☐

40-49 ...................................................... (4) ☐

50-59 ...................................................... (5) ☐

60-69 ...................................................... (6) ☐

70 & over .................................................. (7) ☐

47. What is the highest grade in school you had an opportunity to complete? CHECK

| Elementary | | | High School | | College | | Beyond College |
|---|---|---|---|---|---|---|---|
| 1 - 4 years (1) | 5 - 6 years (2) | 7 - 8 years (3) | 1 - 3 years (4) | 4 years (5) | 1 - 3 years (6) | 4 years (7) | (8) |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

48. Have you had, in addition to the above, at least a school-year of training in business, nursing, or other technical specialty?

Yes (1) ☐ No (2) ☐

49. Have you purchased a fishing or hunting license during the last three years?

Yes (1) ☐ No (2) ☐

50. Now we would like to ask about some of the special interests you have. For each of the interests I name, will you tell me if you participate in it or have only general interest in it, or have no interest in it?

| | I participate (1) | General interest (2) | No interest (3) |
|---|---|---|---|
| a. Bird watching .... | ☐ | ☐ | ☐ |
| b. Boating .......... | ☐ | ☐ | ☐ |
| c. Camping .......... | ☐ | ☐ | ☐ |
| d. Collecting insects .......... | ☐ | ☐ | ☐ |
| e. Discussion groups ........... | ☐ | ☐ | ☐ |
| f. Fishing .......... | ☐ | ☐ | ☐ |
| g. Flower arranging ........ | ☐ | ☐ | ☐ |
| h. Golf ............. | ☐ | ☐ | ☐ |
| i. Hiking ........... | ☐ | ☐ | ☐ |
| j. Hunting .......... | ☐ | ☐ | ☐ |
| k. Nature study ..... | ☐ | ☐ | ☐ |
| l. Raising flowers............ | ☐ | ☐ | ☐ |
| m. Reading books .... | ☐ | ☐ | ☐ |
| n. Swimming ........ | ☐ | ☐ | ☐ |
| o. Vegetable gardening ........ | ☐ | ☐ | ☐ |

51. We need to know some of your interests and participation in certain organizations during the past 12 months. For each of the organizations named will you tell me: a. Were you a member? b. Did you usually attend meetings? c. Did you serve on any committees? d. Did you hold any offices?

| | CHECK IF YES | | | |
|---|---|---|---|---|
| | a. Member | b. Usually attended meetings | c. Served on committee | d. Held office |
| PTA ................ | ☐ | ☐ | ☐ | ☐ |
| Audubon ............ | ☐ | ☐ | ☐ | ☐ |
| Garden Club ........ | ☐ | ☐ | ☐ | ☐ |
| Rotary ............. | ☐ | ☐ | ☐ | ☐ |
| Kiwanis ............ | ☐ | ☐ | ☐ | ☐ |
| Lions .............. | ☐ | ☐ | ☐ | ☐ |
| Toastmasters ....... | ☐ | ☐ | ☐ | ☐ |
| A sportsman club (Specify) ________ | ☐ | ☐ | ☐ | ☐ |
| Home Demonstration Club ............... | ☐ | ☐ | ☐ | ☐ |
| AAUW ............... | ☐ | ☐ | ☐ | ☐ |
| League of Women Voters ............ | ☐ | ☐ | ☐ | ☐ |

52. Do you have a working radio? Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 59.

53. When do you (RESPONDENT) usually listen to the radio? CHECK ONE OR MORE.

a. 5-9 a.m........... ☐

b. 9-12 noon ........ ☐

c. 12-1 p.m.......... ☐

d. 1-6 p.m............ ☐

e. 6-12 p.m........... ☐

f. Don't usually listen to ......... ☐

g. Don't ever listen to radio .......... ☐

IF DON'T USUALLY LISTEN, SKIP TO QUESTION 55.

IF DON'T EVER LISTEN, SKIP TO QUESTION 59.

# VITA

The author was born in Irvin County, Georgia, on 15, November, 1939, as the daughter of Joe H. and Nadauna Whelchel Morgan.

In 1960, the author received the Bachelor of Science Degree in Home Economics from the University of Georgia. In the summer of 1965, the author enrolled in the graduate school at Virginia Polytechnic Institute. Subsequently, the author attended the University of Maryland during the summer of 1966, the winter and spring of 1967 at the University of Richmond, the summer of 1967, at the University of Connecticut, and then returned to V.P.I. in the winter of 1968 where the author remained until completion of the degree.

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On December 4, 1960, the author was married to Dr. Francis Marion Bush, III, who presently is professor at the Medical Science Division of the Virginia Commonwealth University, Richmond, Virginia.

Madge Morgan Bush

# ABSTRACT

A study was made of 801 middle and upper-middle income class urban dwellers, 600 from Richmond and 201 from Roanoke, Virginia, to determine the level of their knowledge of and attitude toward chemical pesticides. Certain profile characteristics were delineated and accessed for their relationship to the benchmark data.

This sub-study was designed from data obtained from the primary study, "The Effect of a Planned Communication Program on Changes of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides," Budget Bureau No. 40-6673, Dr. R. H. Gruenhagen, Project Leader.

The sample audience scored approximately 70 per cent on the general knowledge questions and approximately 30 per cent on questions pertaining to knowledge of government regulations. This trend followed an evaluation of levels of attitude where general attitude was more favorable than attitude toward government regulations of pesticides and their use.

The mean educational level for the population was 12.5 years; mean age was 49.7 years; three-fifths of the urban dwellers spent their early childhood in metropolitan areas and one-third were members of selected organizations. The majority of urban dwellers participated in certain special interest activities.

Urban dwellers from Richmond had a significantly higher level of education than urban dwellers from Roanoke. However, there was no significant difference between the benchmarks for the two groups of urban dwellers.

This sub-study indicates that extension educational programs on pesticides should give added emphasis to information on the role of government in regulating their use. Extension educational programs should be tailored to appeal to the high educational level and broad special interest activities of this urban audience.

Appendix D

# ANALYSIS AND EVALUATION OF A CHEMICAL PESTICIDE INFORMATIONAL PROGRAM PLANNED FOR AN URBAN AUDIENCE

by

William A. Hamilton

Thesis submitted to the Graduate Faculty of the

Virginia Polytechnic Institute

in partial fulfillment for the degree of

MASTER OF SCIENCE

in

Extension Education

APPROVED:

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May 25, 1968

Blacksburg, Virginia

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# CHAPTEP I

## INTRODUCTION

### Background

Subsequent to the national furor created by Miss Rachel Carson's Silent Spring (1)[1] in summer 1962 and the Mississippi River fish kill in the fall of 1963, the American public for the first time became aware of chemical pesticides and their widespread use. The book, said Senator Abraham Ribicoff (2) "brought forth a great expression of public anxiety over chemical pesticides in our environment. The . . . fish kill served to dramatize Miss Carson's forboding prophecy of an impending silent spring."

Between the book's publication and the fish poisoning, the President's Science Advisory Committee (in May 1963) reported the use of pesticides as the nation's most important weapon for controlling pests. The concensus was that little human health hazard exists when known hazards of these poisonous substances are weighed against the benefits of modern food production and disease control. As a result of this report, federal agencies were directed to coordinate their resources and talents in the dissemination of knowledge about chemical pesticides in such a manner to replace public anxiety with confidence.

As an agency of the federal government, the United States Department of Agriculture has been charged with the responsibility of registering pesticides and regulating and controlling their use for the increasing benefit of the public, and thus preventing the contamination of the nation's environment. One of the laws empowering the USDA to make the use of pesticides less hazardous to the public is the Federal Insecticide, Fungicide, and Rodenticide Act (3, pp. 163-173).

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[1] Numbers in parentheses refer to entries in the Bibliography; where appropriate, references to specific parts of a work are noted.

The government can go only so far in legislating man's good fortune; the safe and proper use of chemical pesticides lies with their users, the American consumers. To help the public prevent misuse or improper use of chemical pesticides, USDA turned to its informal educational arm--the Cooperative Extension Services at land-grant colleges and universities throughout the United States. Extension Service directors everywhere were instructed to plan training schools and information programs, according to Brady (4, p. 3) "to educate users on the most effective way to use pesticides, the importance of following label instructions, and the dangers of misuse." More than two million dollars were appropriated to state Extension Services to have this mission accomplished.

To fulfill its responsibility in this educational program, the Virginia Cooperative Extension Service established a Chemical, Drug, and Pesticide Unit led by a coordinator assisted by two specialists. This unit immediately began its job by reviewing chemical recommendations made by Extension specialists and agents (and by agricultural researchers), by developing statements directing Extension's clientele toward safe and proper use of recommended chemicals, and by bolstering current subject matter programs with information about chemical pesticides wherever appropriate.

In addition, the Unit planned, designed, and conducted in 1966, under a special grant from the Federal Extension Service, a comprehensive research project titled, "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides." For the sake of brevity, this project will hereafter be referred to as the primary study.

This thesis is a sub-study concerned with the communication aspects of the primary study conducted by the VPI Chemical, Drug, and Pesticide Unit.

## The Research Problem

It is extremely difficult to design informational or communication programs aimed at changing knowledge and attitudes of the urban dweller when there appears to be little knowledge about the audience or about how well Cooperative Extension's methods can disseminate educational information to and communicate with this newer audience in Virginia.

## Purpose of This Sub-study

The purpose of this sub-study is to assess the effectiveness of the Extension Information Project of Virginia's Cooperative Extension Service in reaching the urban dweller, as can be determined from results of data from a planned communication program involving chemical pesticide information. This is an attempt to measure two levels of communications effectiveness, i.e., exposure of audience to information, and changes identified as a result.

## Objectives of This Sub-study

The objectives of this sub-study are:

1. To determine the numbers of people reached in the urban sample with a communication program designed for the chemical pesticide primary study.

2. To determine the adequacy of contact and coverage, based on criteria established in a review of literature, of the various mass communications media (television, radio, newspapers, and the publication) used in the primary study.

3. To investigate and assess change in knowledge and attitudes of the sample.

## Scope of This Sub-study

This sub-study was confined to the residents of Richmond, Virginia, as delineated in the primary study (discussed in Chapter III). The data presented are not offered as generalizations about all urban dwellers, nor about specific subgroups other than the subgroup specifically defined as "middle and upper-middle class" in the primary study.

## Definition of Terms

Audience in this sub-study is synonymous with sample--the people to whom the primary study communications program was aimed.

Contact is the ability of communications media messages to be perceived by individuals in an audience. In this sub-study the term is synonymous with "exposure."

Coverage as used herein is the number of persons in the sample able to receive satisfactory radio or television signals, able to have delivered or otherwise obtain a newspaper, or able to pick up a free publication.

Effectiveness is used herein to describe the degree to which changes in knowledge and attitudes can be attributed to exposure to mass communications media.

Medium identifies any one of the several vehicles by or through which messages are communicated from a source of information to recipients of the information. The plural is media.

Reach is the number of persons in the sample or audience who can recall at least one exposure to a communications medium, or those people who perceive the message.

Readers, listeners, viewers are persons in the sample who can recall specific messages after reading them in newspapers or publications, listening to radios, or watching them on television.

## Description of the "Planned Communication Program"

In March 1966, members of the Agricultural Information Department of VPI assisted members of the Chemical-Pesticide Unit in "determining what constitutes an effective communication program."[2] Information specialists designed a program for mass media implementation, involving television, radio, newspapers and publications. This program came to be known as "the treatment" part of the primary study.

---

[2] W. R. Van Dresser, Chemical-Pesticide Coordinator, in a preliminary design outline of the primary study, distributed in early March 1966 to participants in the study.

Design of the primary study included an outline of subject matter content for the informational effort. Content was general, including definition and description of chemical pesticides, reading and understanding terms on pesticide labels, the role of the federal and state governments in regulation and control of pesticides, misuse of chemicals, safe and proper ways to use them, problems urban dwellers may solve by using chemical pesticides, buying and using the right pesticide for a specific problem, storing and preserving surplus pesticides safely, and destroying empty chemical containers. This is perhaps an oversimplification of content of the communication program, but a general idea of subject matter is all that will be needed for this sub-study.

Following is a brief description of the effort expended in reaching the target audience with educational information from August 26 through September 22, 1966.

Television. (5) Three television stations in Richmond were sent a complete set of ten 60- and 20-second spot announcement films of "Larry the Label." This cartoon character was created by another state's Extension Service and purchased for use in the primary study. Stations WRVA-TV, WTVR-TV and WXEX-TV each used the set of spots 30 times as between-program or station-break announcements.

In addition, seven 9 1/2-minute programs were presented over WRVA-TV. Four of them were inserts in the regular Extension "Town and Country" program broadcast daily at 6:15 a.m. The other three programs were presented as 3:00 Sunday afternoon specials under the title "Pests or Plenty."

Radio. (5) Four 5-minute radio programs were tape-produced for station WRVA's use on its regular Tuesday morning broadcasts of VPI Extension information from 6:00 to 6:30. The same four programs were used during the treatment period by WTVR from 6:30 to 6:45 a.m. on various mornings.

Also, radio stations WRVA, WTVR, and WLEE each received a special disc recording of 12 one-minute spot announcements featuring various celebrities, among them Kukla, Fran, and Ollie. These stations were not asked to conduct log surveys to record actual usage of the recordings, but information specialists were assured the spots were used on a saturation (whenever possible) basis.

Newspaper. (6) The press phase of the treatment was limited to the Richmond Times-Dispatch. The Extension news editor wrote four stories (one general and three feature) with a "Richmond slant" exclusively for this newspaper. Illustrative photographs were prepared and submitted with the stories, with a request of the editor that they be used at his discretion during the study.

The one general story was printed on Monday, August 29, 1966. It received good display across six columns, with one picture. None of the other stories was used.

Publication. (7) The two-color, 12-page publication "Passport to a Better Life" was developed from a topic outline suggested by the Chemical-Pesticide Unit. It was written, edited, and designed by the Information staff; printing was done commercially in Richmond.

The order of 50,000 copies was delivered to the Henrico County Extension Agent for redelivery to outlets in the study area. The publication was distributed free choice to the consumer audience by being displayed at two medical centers, 18 hardware stores, seven schools, and seven garden center supply stores. (8) More than 37,000 copies of "Passport" were returned to VPI for Statewide use after the primary study was concluded in Richmond.

# CHAPTER II

## REVIEW OF LITERATURE

Review of literature concentrated in three general areas: (1) theoretical background material and related chemical pesticide and consumer research; (2) measuring communications effectiveness; and (3) studies of the mass media, including television, radio, newspapers, and publications (magazines).

### Background Material

Theoretical Studies. The primary study had as one of its goals ascertaining "the relative effect of various Extension methods used in a planned communications program in bringing about a change in attitude toward, and knowledge of, pesticides and chemicals on the part of the selected audience (9). Evaluating the communications program, in this light, led to a review of pertinent related theories, which were articulated recently by Hadley Read (10). These include the Theory of Selective Exposure--people will read and listen to those things that interest them more than they will to those things that don't interest them; Theory of Selective Perception--people will perceive what they want to perceive; Theory of Selective Retention--people have the capacity to believe and remember what they want to, and "black out" what they don't want to believe or remember; and Theory of Expectation--past experiences are the best guides to future actions.

It is not known precisely what roles these theories played in design of the primary study or conduct of the communications program.

In discussions of Extension and communications methods, several writers alluded to the selective exposure theory in one way or another. Mehren (11) said "The greatest challenge we face in the communications field is knowing our audience." Shipman (12) in her thesis concluded: "an educational institution . . . needs to conduct research and determine attitudes of potential audiences before determining best ways of disseminating information." Parsey (13) stated, "Communications content can be made more acceptable or believable by associating it with the prestige of an institution, an expert, or a communications medium."

Klapper (14, p. 45) seemed to be referring to the selective perception theory when he wrote: "Communications researchers . . . have found . . . persuasive mass communication is particularly unlikely to produce conversions and particularly likely to reinforce existing attitudes." In another writing, Klapper (15, pp. 453-474) listed several variables which influence what is perceived in mass communications, including contextual organization, audiences' image of the source, passage of time, group orientation of the audience member and value of group membership, activity of opinion leaders, social aspect of the situation both before and after exposure, and nature of the media. Negative aspects of this theory were summarized by Robinson (16): "the mass audience is notoriously uninterested in becoming involved in the problems they share and should face."

Klapper (14, p. 51) discussed two phenomena embodied in the selective retention theory as related to effects of persuasive communications. These are (1) minor changes in attitudes frequently follow exposure to persuasive communications, and (2) "ego-involved" attitudes are particularly resistant to change. Klapper (15, pp. 453-474) also said that mass communications doesn't serve as the cause of audience effects, but functions through a nexus of mediating factors and influences, which thereby make mass communications a contributory agent in reinforcing existing attitudes. He indicated that retentive effects of mass media are affected by aspects of the media themselves. Related to the selective retention theory is Robinson's (16, p. 314) conclusion that the dominant effect of media is stasis, or reinforcement of attitudes and conditions; the least common effect is conversion.

Aspects of the theory of expectation were discussed by several writers. Lionberger (17) said the agriculture college, specialists, and county agents are legitimate, socially acceptable sources of information for farmers and can be the same for city dwellers. Cutlip and Center (18, p. 154) warned, however, "that no program, simply because it worked once before in a given situation can be deposited in every new situation of the same type." And Parsey (13) insists the study of techniques has yielded inconclusive findings--psychological findings are implied as more reliable guides to action.

Perusal of recent theoretical literature can best be summarized by paraphrasing some conclusions reached by Hyman and Sheatsley (19, pp. 412-423). These writers claim that selective exposure is produced by prior attitudes and a person tends to expose himself to information congenial to prior attitudes; that a person's perception and memory of materials are often distorted by his wishes, motives, and attitudes; that it is naive to suppose that information always affects attitudes or that it affects all attitudes equally; and, that the role of interest and psychological barriers must be admitted and not overlooked in designing information to reach the apathetic, hard core of know-nothings.

Chemical Pesticide Studies. In another sub-study, Graham (20, p. 60) pointed up the need for "an evaluative study of present Extension methods of using mass media communications to reach the middle class urban audience," the women in which she identified and made a partial profile of from the primary study data. Frederick and Powers (21) warned of possible danger spots in pesticide communications in a study of terminology comprehension of pesticide labels. He described good communication as "crucial to safe and effective use" of chemicals, and concluded that Extension could well do its educational work with people who sell chemicals. Beal, Bohlen and Lingren (22, p. 20) reported on Iowa farmers' knowledge, attitudes, and use patterns with respect to agricultural chemicals in 1966. They found that 56.7 per cent of the group studied got their information about new chemicals from mass media, but only 19.6 per cent of their 229 interviewees (all farmers) got this kind of information through Extension methods.

Consumer Research Studies. In 1955 Matthews and Ueland (23) reported on effectiveness of mass media in Louisville, Kentucky, and concluded that "Through the use of the newspapers, the radio, and television, three in every five of the respondents had been contacted," at least once by one or more of the media. Simonds (24) wrote in 1958 that half the urban-oriented food buyers in an Ohio study wanted and got help with their problems from newspapers, one of Extension's most-used methods, but used radio and television as sources of information also. In finding that 12.5 per cent of a Massachusetts suburban audience was aware that Extension was a source of horticultural information, Barcus (25) suggested that Cooperative Extension should be better identified with the needs of a suburban population. He recommended that Extension's use of mass media be re-examined.

## Measuring Communications Effectiveness

Review of reports of measuring communications effectiveness was confusing and sometimes discouraging. Capitman (26, pp. 98, 102) decided it was "ridiculous to talk about effectiveness when we have no clear-cut understanding of what we are discussing." Lucas and Britt (27) voiced similar conclusions, i.e., there are too many factors in communications which cannot be measured. They said it is wrong to assume that combining media audiences is valid in measuring effectiveness--the measures of exposures of a reader are non-comparable to measures of exposures of a viewer. Politz (28, pp. 46-48) said a complete comparative evaluation of media cannot be achieved; some media sell time, others sell space.

In a 1950 study of techniques for measuring communications effectiveness, Lucas and Britt (28, p. 674) concluded that "proper evaluation must take into account size of audience, classes of people of which the audience is composed, attitudes of these people." These authors (27, p. 329) in 1963 discussed attitudes of audiences toward media vehicles, attitudes of audiences toward messages in general, and attitudes of audiences toward specific messages in another approach to measuring effectiveness. They concluded: "There is, as yet, no clear concept of dimensions of attitudes, nor is there any practical measuring procedure having widespread acceptance."

Other aspects of communications effectiveness reported in the literature included pure recall measures, aided recall measures, and recognition measures. Additional factors discussed by researchers in the review of literature were: physical differences within media, necessity of evaluating each medium as seen by its own audience, tendency for researchers to assume most readers and viewers can recall long enough and discriminate well enough to give accurate information, emphasis upon "who" as well as "how many" are reached by particular media vehicles, and numbers of people mean little if they (numbers) can't be related to changes in behavior. These elements all contributed to the philosophy of this sub-study.

Sarbaugh (30) assessed effectiveness in terms of getting attention and contributing to change. He claimed that when the communicator develops an informational campaign based on a rather thorough knowledge of his audience, measurable gains in the audience's knowledge, attitudes, and adoption will occur in the direction intended by the communicator.

The confusion of ideas and thoughts about measuring communications effectiveness resulted in borrowing an idea from Starch (31, pp. 39 ff). He hypothesized that if advertising's purpose is to change peoples' minds (introduce an idea, alter an impression, strengthen a conviction) then measurement of what happened in peoples' minds would be a legitimate measurement of performance, or effectiveness. The changes in knowledge and attitudes are what happened to the minds of people involved in the primary study, so measuring these changes should assess effectiveness of the communications program. That is what this substudy proposed to do.

## Studies of the Mass Media

The review of literature concentrated on mass media in an attempt to find basis for evaluating an informational effort. Informative, if not strictly pertinent and comparable, data were found for each medium used in the primary study.

Television. This medium was a source of news and entertainment in 91 per cent of U. S. homes in 1963, compared to 44 per cent of households owning television sets in 1953. Ownership figures in 1964 were 93 per cent for the U. S. and 90 per cent for Virginia. The average televiewer watched his set about five hours, 19 minutes daily in 1951. The average increased to about six hours, 20 minutes daily in 1964-65.

The majority of these hours with television was spent for relaxation and diversion. According to Steiner (32, p. 202), 8 per cent of viewing time in 1963 was spent in watching information programs, and 41 per cent in watching entertainment. A 1960 report stated 77.7 per cent of viewing time in New York City was spent watching entertainment programs. Winfield (33) reported in 1966 that television stations scheduled entertainment 74 per cent of the time during the day, and 84 per cent during nighttime hours. About 60 per cent of U. S. households in 1961 watched television in the evening hours--the most preferred being between 8:00 and 9:00 p.m.

In 1953, Politz (34) predicted each showing of five national television shows could reach from 13.3 per cent to 23.6 per cent of U. S. population. His projection to the 119.6 million population was based on a sample of 7,141 people. Matthews and Ueland (23, p. 8) reported television covered 20 per cent of its potential clientele in that city in 1955, and that coverage represented the only means of reaching seven per cent of the households in the study.

Woods (35) and Hoffman (36) advocated adoption of 20- and 60-second "spot" announcements as television carriers of Extension's educational information messages, because their length makes them easier to use than other programming materials in filling unsold commercial time. Woods (35) also found that an essential element in effective use of spot announcements is "timeliness" of the message in meeting needs of the audience.

Radio is less an entertainment medium than is television. Because listeners can use radio while doing other things, they have reported it is preferred for news, weather reports, and music. The Journal of Psychology reported in 1949 that human interest and spectacular events broadcast by radio were better remembered by their listeners than were serious public affairs programs. Lambert (37, p. 13) reported that in 1962 radio stations across the country averaged $300,000 worth of public service programming, and that television gave an estimated 16 billion "public service impressions" that year.

Radio is available in about 92 per cent of U. S. homes, but this medium reaches only about three per cent of its potential audience in prime listening hours, according to Niefeld (38). Several studies (39), (40), (41) reported most radio listening is done between 6:00 and 9:00 a.m., by more women than men, from 90 minutes to three hours daily; and one found listeners turned to radio an average of 24 hours, 45 minutes per week--including auto portable radio listening. Richmond, Virginia listening habits closely paralleled this profile during the time of the primary study in 1966 (42).

Winfield (33) claimed that radio stations normally schedule 75 per cent entertainment and music, 10 per cent news, and 15 per cent commercials and all other types of broadcasts.

Politz (34) estimated that 8.2 to 15 per cent of the total U. S. population owning radios could be reached by each single presentation of a series of four shows broadcast nationwide, in 1953. In 1955, Matthews and Ueland (23, p. 8) reported that radio covered about five per cent of its potential Louisville clientele and it was the sole means of reaching three per cent of all households in the sample. Crile (43, pp. 9, ff.) summarized several radio studies in 1955. In one of these five per cent of the audience provided information for an evaluation study; in another, 26 per cent of the interviewees gave recall responses; and in another, 40 per cent of the potential audience provided data for evaluating effectiveness. Results of the Richmond survey (42) were published from responses of 87 per cent of the households interviewed.

Timing and timeliness were emphasized by Mandell (44, pp. 16-18) in his 1963 radio study. He said: "The timing of the broadcasts stands out as the chief practical consideration in education via radio." Other researchers said radio listeners want their educational programs to be entertaining also, or they would rate them low in interest. Like television, radio is changing to more spot announcements in all types of broadcasting.

Newspapers. Through the years, newspapers have been the primary source of news and information for the American public. In one study reviewed (45, pp. 63-76) 90 per cent of respondents named the local newspaper as the source of information about the topic being studied. In Louisville, Matthews and Ueland (23, p. 8) reported newspapers covered 45 per cent of their potential clientele during the study, and were judged to be the sole means of reaching 30 per cent of the audience.

Wilson and Gallup (46, p. 59) indicated that about 85 per cent of the total adult population read one or more newspapers. In another study, Porter (47) reported four-fifths of the sampled households were receiving one or more newspapers. In Richmond during the summer of 1966, there were an estimated 146,200 households (48). The morning daily reached 62 per cent of this potential audience, the evening daily reached 74 per cent of the potential, and together the newspapers reached 90 per cent of this potential, as reported by the newspapers.

In 1957 Read (49) reported that daily newspapers tend to be more selective than weeklies in using agricultural and other Extension releases, and said that "Most editors are satisfied with information content of releases, but emphasize the need for a "news angle." From the public's viewpoint, a recent report from Richmond (50) says: "It is evident that there is a very high degree of acceptance and approval of advertising in both newspapers . . . and that this is in rather sharp contrast with the attitude towards the other media."

Publications. As far as could be determined from the literature review, the free-choice method of publications distribution (as employed in the primary study) has not been measured for effectiveness. Bulletins, circulars, pamphlets, folders, etc. "are better used to supplement other teaching methods than for initiating the teaching process" (46). Publications are generally believed to be most effective when used as aids in a planned educational program providing interest and need for the information exist or are aroused.

"Reach potential" as an effectiveness measure was described by Papazian (51, pp. 6-7) in a 1964 magazine study. During the study, he determined that adults reached per copy of Life were 4.7; for Look were 4.1; for Post 3.6. He concluded: "This and other research indicates that a typical weekly (Life and The Post) will reach about 50 per cent to 65 per cent of its total issue audience during the first week . . ." He estimated that a monthly publication reaches 60 per cent to 65 per cent of its total issue audience in the first two weeks.

In 1966 Papazian (52, pp. 60-65) made some further observations on audience accumulation patterns he had studied from 1955 through 1964. He concluded that the typical mass weekly reaches 60 per cent of its audience in one week and 80 per cent in two weeks. First-day reach was as high as 90 per cent for a Sunday supplement, to as low as 15 per cent for The Post.

## Summary

The literature review can be summarized as follows:

Informational programs should be based on research into knowledge, attitude, and interest levels of the audience; the most common effect of information contact is reinforcement of existing attitudes; Extension is legitimate and socially acceptable to urban audiences; Extension's role and methods should undergo constant examination and evaluation in light ot its changing audiences.

Search of the literature revealed no completely accepted, foolproof methods of measuring communications effectiveness, but testing changes in knowledges and attitudes has credence.

Television was watched about six hours daily, mostly in the evening for entertainment, and reached an average 20 per cent of its potential audience with any given message. Radio was listened to mostly by women about three hours daily throughout the day, and reached about five per cent of its potential audience with a given message. Newspapers continued to be the most acceptable of mass media, reaching as much as 90 per cent of the population and having the ability to reach effectively 45 per cent of a potential audience. Publications were best used to supplement other media in communications programs. Magazines were studied as a basis of comparison for purposes of this study, and literature revealed 65 to 80 per cent of potential audiences were reached in two weeks. This was reach potential--the longer a publication was available, the more people saw it.

# CHAPTER III

## METHODOLOGY

### Population and Sample

Data for the primary study were taken from city residents in Richmond (the experimental group) and from Roanoke (the control group). The plan for random sampling in both cities was designed by Dr. Charles E. Ramsey,[1] one of the consultants for the primary study.

Sampling was limited to those people who were (1) residents of a metropolitan population of 75,000 or more; (2) residents of middle and upper-middle income housing areas, as "determined by the housing evaluation level of the cities and by consultations with Extension agents" (20, p. 18); (3) residents living in single-unit, unattached dwellings; and (4) residents of households with equal numbers of homemakers or male heads.

There were 1,197 interviews made in Richmond--600 before the informational program was conducted, and 597 after the program was completed. In the control group (Roanoke) 201 interviews were made concurrently with interviewing in Richmond before the informational treatment, and 213 respondents drawn at the same time the post-treatment sample was taken in Richmond.

Maps and U.S. Census of Housing publications (20, p. 19) for Richmond and Roanoke were used to select sampling areas in both cities. Blocks within these areas were numbered consecutively, and five houses within each block were selected for interviewing (according to a book of random numbers used to draw the sample). Applicable criteria for selecting houses to interview were: (1) for a four-sided block, one corner house and one house from each side; (2) for a three-sided block, two houses each from the opposite sides (including one corner house from one of these sides) and one house from the odd side; and (3) for a two-sided block, one corner house and two houses each from the two sides (20, p. 20).

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[1] In 1966, Professor of Research Methods, University of Minnesota.

## The Interview Schedule

The instrument of observation used in the primary study was a personal interview schedule, the original of which is reproduced as Appendix A. The interview schedule was designed by Dr. Van Dresser and Dr. M. C. Heckel,[2] original project leaders for the primary study, in consultation with Mrs. Laurel Sabrosky.[3] The schedule consisted of 70 questions. The first 51 questions were used in sampling each pre-treatment group; all 70 were used to interview each post-treatment group.

The interview schedule was pretested by its designers with a group of people possessing characteristics similar to those of the respondents in the primary study samples.

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[2] In 1966, Professor and Head, Extension Education, and Extension Training Leader, Cooperative Extension Service, Virginia Polytechnic Institute.

[3] Formerly Extension Research Specialist in Evaluation, Research, and Training, Federal Extension Service, United States Department of Agriculture.

The interview schedule was designed to gather data about the audiences' (1) attitude toward pesticides, (2) knowledge of buying, using, and storing pesticides correctly and safely, (3) knowledge and attitude toward regulations and legislation concerning pesticides, and (4) exposure to Extension's chemical-pesticide information program.

Trained interviewers were employed by Psychological Consultants, Inc. (1804 Staples Mill Road, Richmond) to gather data with the questionnaire. Pre-treatment interviews were conducted in July and August 1966 by 29 interviewers; post-treatment respondents were contacted in September and October 1966.

In both Richmond and Roanoke, a "reinterview group" was established to provide a basis for comparison. After the pre-treatment interviewing was completed, numbers were assigned to interview schedules from both cities. From a table of random numbers, interviewees in each sample were selected for reinterview following treatment. The first 50 respondents to agree to be reinterviewed comprised the "reinterview group", but because two interview schedules could not be matched in the Roanoke sample, that group was reduced to 48 respondents.

Data from the interview schedules were tabulated by the Chemical-Pesticide Unit staff, and coded for processing by the 7040 and 1401 computers at the V.P.I. Computing Center. That facility processed all the data for the primary study, and provided all calculations used in this sub-study.

## Data for This Sub-study

Data used in this thesis were those taken from the interview schedules of the 597 post-treatment respondents in the Richmond population. The data deemed appropriate and essential in reaching objectives of this sub-study included: (1) responses to six questions previously coded to indicate respondents' familiarity with or knowledge of content of the informational program, and (2) knowledge and attitude scores of people in the post-treatment sample.

The coding of the six questions involved assigning a specific number to a response which indicated recall of subject matter presented in the program, and assigning different numbers to responses reflecting perception of chemical pesticide subject matter not specifically included in the planned program. These responses, or instances of recall, have been identified as contacts. Those questions judged to indicate contact by media with the specific content of the planned program are handmarked with an asterisk in Appendix A.

Average knowledge and attitude scores were taken from interview schedule questions previously identified by Mrs. Sabrosky and designers of the study as those which, when answered, would reflect the respondents' knowledge and attitude. The questions, in Appendix A, are keyed by hand: KG for "knowledge general," KGT for "knowledge government," AG for "attitude general," and AGT for "attitude government." These categories will be used in the data analysis.

Data cards on the Richmond post-treatment sample of 597 people were sorted by individual columns to indicate contacts by the various media, and interview schedule numbers were recorded after each sorting. The recorded interview schedule numbers were arranged numerically on a chart, and after each number a checkmark was made in the appropriate column to indicate which medium was involved in the contact. Mass media contacts are summarized in Chapter IV.

## Data Analysis

Since there were data from one sample used for this sub-study, and since the numbers were relatively small, it was decided to employ the t test (53, pp. 223-242) in determining significance of indicated changes in knowledge and attitude and relating them to exposure to the informational program.

# CHAPTER IV

## ANAYLSIS OF DATA

The analysis of data is presented to indicate who was contacted by the planned informational program and how the contacts were made, to indicate whether there was change in knowledge and attitude by comparing their scores with knowledge and attitude scores of people in the sample who were not contacted by the planned program, and to indicate whether the change was significant by statistical testing.

Scales for scoring respondents' answers were established in the primary study, and are described here to point out that ample room existed for improvement in the level of knowledge and attitudes of the sample. A perfect "knowledge general" score was rated 5.3; a perfect "knowledge government" score was rated 7.5. Likert's International Scale (54, p. 319) was used to score"attitude general" and "attitude government" responses. In this scale, 5.0 is a neutral attitude score, 10.0 scores a favorable attitude, and 0.0 indicates unfavorable attitude.

Because knowledge and attitude scores are rated on three different scales, it is emphasized that no attempt should be made to compare numerical levels between the four categories of scores analyzed in this chapter.

## Pattern for the Analysis

It was decided to consider data for this sub-study according to the following pattern:

(1) Determination of the number of contacts made in the Richmond sample by television, radio, the newspaper, and the publication which carried the informational program of the primary study.

(2) Determination of the number of people represented by the contacts.

(3) Determination of coverage of audience, or percentage of audience contacted, by each medium.

(4) Identification of people contacted by each medium, and tabulation of their knowledge and attitude scores.

(5) Comparison and testing of four dependent variables against 12 independent variables. The dependent variables are general knowledge, knowledge of government, general attitude, and attitude toward government about chemical pesticides. The independent variables include contact by television, contact by radio, contact by newspaper, contact by the publication, contact by all media, contacts by one and by more than one medium, contact by "Larry the Label," recall of the subject of "Larry the Label," television set owners in the Richmond "reinterview group" who saw "Larry the Label," television set owners in the Richmond "reinterview group" who did not see "Larry the Label," the total Richmond "reinterview group," and the total Roanoke "reinterview group."

## Contacts Made by the Informational Program

From tabulation of responses to the six questions defined in the preceding chapter, it was determined that mass media in the planned communications program made 165 contacts in the Richmond audience. Mass media contacts are summarized in the following table.

TABLE I.--Number and percentage of contacts accomplished by each medium in the planned informational program in the Richmond sample.

| Medium | Contacts | |
|---|---|---|
| | Number | Per cent |
| Television | 103 | 62.42 |
| Radio | 24 | 14.55 |
| Newspaper | 12 | 7.27 |
| Publication | 26 | 15.76 |
| Totals | 165 | 100.00 |

## Number of People Represented by Contacts

Recording interview schedule members revealed that some people were contacted by more than one mass communications medium. This was expected. To determine how many individuals the 165 contacts represented, the number of contacts by one medium were counted. Added to this figure were the number of double contacts divided by two, and the number of triple contacts divided by three. No person was contacted by all four media. Table II summarizes the recording of contacts.

TABLE II.--Communication contacts by kind and number in the Richmond post-treatment sample.*

| Medium | 1 Contact | 2 Contacts | 3 Contacts | Totals |
|---|---|---|---|---|
| Television | 85 | 16 | 2 | 103 |
| Radio | 11 | 11 | 2 | 24 |
| Newspaper | 5 | 6 | 1 | 12 |
| Publications | 16 | 9 | 1 | 26 |
| Totals | 117 | 42 | 6 | 165 |

*No individual was contacted by all four media.

The total of 103 contacts by television indicates 16 by television and another medium, and two by television and two other media. For this sub-study it was determined that complete identification of the multiple contacts was unimportant, so long as single contact of each medium could be determined.

Table III describes the number of people contacted by the informational program.

TABLE III.--People represented by 165 media contacts and percentage of the Richmond sample contacted.

| Exposure | People | |
|---|---|---|
| | Number | Per cent |
| One Medium only | 117 | 19.60 |
| Two media (42/2) | 21 | 3.52 |
| Three media (6/3) | 2 | 0.33 |
| Four media | 0 | 0.00 |
| Total people contacted | 140 | 23.45 |
| People not contacted by media | 457 | 76.55 |
| Totals | 597 | 100.00 |

It was expected that the numbers of people contacted by four media would exceed the number contacted by a single medium but the opposite proved to be the case. A four-media program would not be expected to contact less than one-fourth its potential audience.

The following table describes the percentage of the sample contacted by each medium, as listed in Table II.

TABLE IV.--Percentage of sample contacted by one communications medium, Richmond.

| Medium | People<br>Number | <br>Per cent |
|---|---|---|
| Television | 85 | 14.24 |
| Radio | 11 | 1.84 |
| Newspaper | 5 | .84 |
| Publication | 16 | 2.68 |
| Totals | 117 | 19.60 |

n = 597

The review of literature indicated a similarity of contact might be achieved by newspapers and television in a planned program; that was not the case in the primary study. This table is a by-product of procedures employed in determining how many people were contacted in the Richmond sample, and is presented to show the relative effect of media employed in the primary study.

## Comparison and Testing of Scores

After identifying people in the audience who had been reached by the informational program, the next procedure was to compare their knowledge and attitude scores with scores of the sample not contacted by any media, and test the differences.

The next 8 tables list average scores and differences between scores of those people exposed to and those people not exposed to the communications program in the primary study. They also indicate degrees of freedom for testing, t values, and significance of the difference at the 5 per cent level of probability. All calculations were provided by the V.P.I. Computing Center.

TABLE V.--Effect of television on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| All television contacts (103) | 3.52738 | 2.63729 | 7.15825 | 5.14401 |
| No contacts by television (494) | 3.51509 | 2.21639 | 7.00013 | 4.95277 |
| | Analysis | | | |
| Difference in scores | 0.01229 | 0.42090 | 0.15812 | 0.19124 |
| t value | 0.121 | 1.999 | 1.021 | 0.784 |
| Significance at 5% | NS | S | NS | NS |

df = 595

The difference in "knowledge government" scores was significant between people who had been exposed to television in the informational program and those who had not been exposed to this medium. Because information about the government's role in chemical pesticides received no special emphasis, compared to information which would influence the other categories, this significant increase in score is unexplained.

TABLE VI.--Effect of radio on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| All radio contacts (24) | 3.33634 | 2.86814 | 6.88750 | 6.05208 |
| No contacts by radio (573) | 3.52479 | 2.26475 | 7.03327 | 4.94110 |
| | Analysis | | | |
| Difference in scores | 0.18845 | 0.60339 | 0.14577 | 1.11098 |
| t value | - 0.965 | 1.487 | - 0.489 | 2.378 |
| Significance at 5% | NS | NS | NS | S |

df = 595

A highly significant difference existed between the "attitude government" scores of people exposed to radio and those not exposed to radio programming in the primary study. As noted with the score change after exposure to television programming, no particular emphasis was placed on information in the program which would result in influencing attitudes toward government more than other dependent variables. This significant change after exposure is unexplained, especially because general attitude scores are lower for people contacted by radio. The observed pattern--decrease in general scores with exposure and increase in government scores with exposure--could not be explained because it does not maintain itself.

TABLE VII.--Effect of the newspaper on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| All newspaper contacts (12) | 3.20608 | 2.81597 | 6.85833 | 6.47917 |
| No contacts by newspaper (585) | 3.52359 | 2.27820 | 7.03088 | 4.95513 |
| | Analysis | | | |
| Difference in scores | 0.31741 | 0.53777 | 0.17255 | 1.52404 |
| t value | -1.162 | 0.946 | -0.414 | 2.330 |
| Significance at 5% | NS | NS | NS | S |

df = 595

A significant difference was found between "attitude government" scores of people who read the newspaper article and people who were not contacted by the newspaper article in the primary study. This increase in score is consistent with the significance of the scores for the same category in the preceding table. A similar pattern was also observed, i.e., general scores were lower for people contacted by the newspaper and government scores were higher for the same people. Content of the newspaper feature story emphasized the role of government, state agencies and rules and regulations concerning chemical pesticides, which can account for the significance of the increase in this score.

TABLE VIII.--Effect of the publication on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| All publication contacts (26) | 3.65768 | 2.93384 | 7.27692 | 5.00000 |
| No contacts by the publication (571) | 3.51082 | 2.25965 | 7.01605 | 4.98511 |
| | Analysis | | | |
| Difference in scores | 0.14686 | 0.77419 | 0.26087 | 0.01489 |
| t value | 0.782 | 1.728 | 0.910 | 0.033 |
| Significance at 5% | NS | NS | NS | NS |

df = 595

No significant differences were found between average scores, in any category, of people who read the pamphlet "Passport to a Better Life" and those who did not read the publication. The lack of significance in changes in these scores is unexplained. This publication received an extraordinary amount of preparation, planning, and distribution maintenance.

It was judged by the primary study designers to be a "quality" presentation, and was expected to be attractive to the audience.

TABLE IX.--Effect of all mass media on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| All mass media contacts (140) | 3.50747 | 2.60731 | 7.14500 | 5.25179 |
| No contacts by mass media (457) | 3.52020 | 2.19150 | 6.99139 | 4.90427 |
| | Analysis | | | |
| Difference in scores | 0.01273 | 0.41581 | 0.15361 | 0.34752 |
| t value | -0.141 | 2.216 | 1.113 | 1.600 |
| Significance at 5% | NS | S | NS | NS |

df = 595

Average "knowledge government" scores of the people who were contacted by the informational program were significantly higher than they were for people who had not been contacted by the mass media in the primary study. The significant increase in score in this category also is unexplained, especially since people who were not contacted by mass media had slightly higher average scores than people who were contacted. In the total program, information to increase knowledge of government was not stressed more than information in the other areas.

TABLE X.--Effect of multiple contacts on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Contacts by one medium (117) | 3.52783 | 2.44994 | 7.20855 | 5.16097 |
| Contacts by two or three media (23) | 3.40393 | 3.40787 | 6.82174 | 5.71377 |
| | Analysis | | | |
| Difference in scores | 0.12390 | 0.95793 | 0.38681 | 0.55270 |
| t value | 0.627 | -1.988 | 1.578 | -1.013 |
| Significance at 5% | NS | S | NS | NS |

df = 138

"Knowledge government" scores were significantly different between those people contacted by one communications medium only and those contacted by two or three media. Although the t value appears negative in the table, the significance indicates more knowledge reflected by people contacted by more than one medium, as should be expected. Although not significant, the change in the attitude government score was in the same direction. Because general scores were higher for people contacted by one medium than for people contacted by more than one medium, the one significant difference in scores is unexplained.

Television made the most contacts in the audience. The television cartoon character, "Larry the Label," was remembered by 80 of the 140 people reached as a single contact, and by 18 others in one or the other "multiple contact" groups. Since these 98 people represent 70 per cent of the contact by the informational program, their scores were included separately in the analysis to determine significance on effectiveness of "Larry the Label" and his approach.

TABLE XI.--Effect of "Larry the Label" on changes in knowledge and attitudes in the Richmond post-treatment sample.

| Item | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| People who saw "Larry" (98) | 3.53454 | 2.62243 | 7.12245 | 5.13690 |
| People who didn't see "Larry" (499) | 3.51381 | 2.22353 | 7.00874 | 4.95608 |
| | Analysis | | | |
| Difference in scores | 0.02073 | 0.39890 | 0.11371 | 0.28082 |
| t value | 0.200 | 1.856 | 0.720 | 0.727 |
| Significance at 5% | NS | NS | NS | NS |

df - 595

There was no significant differences found between average scores of people who saw "Larry the Label" and the people who did not see this cartoon character. This was an unanticipated result, because "Larry the Label" was considered by information specialists to be top quality and was expected to carry his part of the program with significant results.

TABLE XII.--Effect of remembering the subject of "Larry the Label" on changes in knowledge and attitude in the Richmond post-treatment sample.

| People who saw "Larry the Label" | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Subject of program remembered (40) | 3.56653 | 2.41250 | 7.17000 | 4.89792 |
| Subject of program forgotten (58) | 3.51247 | 2.76721 | 7.08965 | 5.30172 |
| | Analysis | | | |
| Difference in scores | 0.05406 | 0.35471 | 0.08035 | 0.40380 |
| t value | 0.292 | -0.791 | 0.345 | -0.799 |
| Significance at 5% | NS | NS | NS | NS |

df = 96

No significant difference was found between average scores of people who saw "Larry the Label" and remembered his subject, and those who saw him but forgot why he was on a television program announcement. It was expected that people who remembered the subject of "Larry the Label" would have scores significantly different from those of people who forgot his subject.

The next four tables describe score comparisons and tests for significance in the "reinterview group" as defined in the primary study and discussed in the preceding chapter.

TABLE XIII.--Effect of "Larry the Label" on changes in knowledge and attitudes of people in the Richmond "reinterview group" who owned television sets.

| Owners of television sets who saw "Larry the Label" | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Before treatment (13) | 3.76371 | 2.17033 | 6.88462 | 6.22436 |
| After treatment (13) | 3.61588 | 1.57051 | 7.19231 | 5.68590 |
| | Analysis | | | |
| Difference in scores | 0.14783 | 0.59982 | 0.30769 | 0.53846 |
| t value | 0.377 | 0.693 | -0.557 | 0.543 |
| Significance at 5% | NS | NS | NS | NS |

df = 24

Significance was not found in comparing average pre-treatment and post-treatment scores of people in the Richmond "reinterview group" who owned television sets and who reported seeing "Larry the Label." These comparisons were the result of concentrating on the largest identifiable group contacted in the reinterview sample. This is a large sub-group (13 people) contacted by television, compared to one person each contacted by radio, the newspaper, and the publication.

TABLE XIV.--Effect of not seeing "Larry the Label" on changes in knowledge and attitudes of people in the Richmond "reinterview group" who owned television sets.

| Owners of television sets who did not see "Larry the Label" | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Before treatment (28) | 3.80981 | 2.32355 | 7.22143 | 5.52381 |
| After treatment (28) | 3.62189 | 2.48462 | 7.32143 | 4.70238 |
| | Analysis | | | |
| Difference in scores | 0.18792 | 0.16107 | 0.10000 | 0.82143 |
| t value | 0.930 | -0.319 | -0.334 | 1.434 |
| Significance at 5% | NS | NS | NS | NS |

df = 54

There were no significant differences in pre-treatment and post-treatment scores of people in the Richmond "reinterview group" who had not been exposed to "Larry the Label." People who did not own television sets at the time of the interview were not included in the analysis. Preceding not significant results make this comparison valueless. This table was included in the original design to determine if any significant changes could be detected and attributed to something other than "Larry the Label."

TABLE XV.--Effect of the planned communication program on changes in knowledge and attitudes in the "reinterview group" of the Richmond sample.

| Reinterviewees | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Before treatment (50) | 3.76802 | 2.18325 | 7.07600 | 5.65833 |
| After treatment (50) | 3.64731 | 2.09972 | 7.18600 | 5.05000 |
| | Analysis | | | |
| Difference in scores | 0.12071 | 0.08353 | 0.11000 | 0.60833 |
| t value | 0.754 | 0.221 | -0.436 | 1.335 |
| Significance at 5% | NS | NS | NS | NS |

df = 98

No significant differences were found between test scores of people in the Richmond "reinterview group" who had been exposed to the planned communications program, and their scores before exposure to the chemical pesticide information. These results reduce the weight of the significances found in comparisons described in tables V through X in this chapter. Because this group is a check on the population sampled, the lack of significant change in the group indicates that the isolated cases of significance reported previously may be considered as chance happenings.

TABLE XVI.--Changes in knowledge and attitudes in the "reinterview group" of the Roanoke control sample.

| Reinterviewees | Average Scores | | | |
|---|---|---|---|---|
| | Knowledge General | Knowledge Government | Attitude General | Attitude Government |
| Before treatment (48) | 3.51598 | 2.80952 | 7.07662 | 5.06944 |
| After treatment (48) | 3.75471 | 2.52199 | 7.80208 | 5.11806 |
| | Analysis | | | |
| Difference in scores | 0.23873 | 0.28753 | 0.72546 | 0.04862 |
| t value | -1.494 | 0.651 | -0.881 | -0.077 |
| Significance at 5% | NS | NS | NS | NS |

df = 94

In the Roanoke "reinterview group," there were no significant variations found in pre-treatment and post-treatment knowledge and attitude scores. The lack of significant change in this control group was expected because it did not receive the planned communications program, which indicates the control was adequate. These results are evidence of the ineffectiveness of the informational contact, since the experimental reinterview group showed no more significance than the control reinterview group, in comparing average scores.

# CHAPTER V

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

### Summary

In partial fulfillment of its responsibility of providing Virginia's citizens with up-to-date, factual information about safe and effective use of chemical pesticides, the Chemical, Drug, and Pesticide Unit of the Cooperative Extension Service in 1966 planned, designed, and conducted a comprehensive research project. The primary study, "The Effect of a Planned Communication Program on Change of Attitude and Knowledge of the Urban Dweller Toward Chemicals and Pesticides," provided the framework for this thesis, which is an evaluative sub-study of the communications aspects of the research project.

Objectives of this sub-study were (1) to determine the numbers of people reached in the urban sample with a communications program designed for the chemical pesticide primary study; (2) to determine the adequacy of contact and coverage, based on criteria established in a review of literature, of the various mass communications media (television, radio, newspapers, and a publication) used in the primary study; and (3) to investigate and assess change in knowledge and attitudes of the sample.

Data for this sub-study were taken from the primary study, for which sampling and interviewing were done by professional consultants.

The sample considered in this sub-study consisted of the 597 people in Richmond, Virginia who were interviewed after a planned communication program had been conducted in that city. The Roanoke control group was considered for one comparison.

Statistical techniques used in this sub-study included frequency distribution, percentage, and t test for significance.

## Findings of This Sub-study

Numbers of People Contacted. Data card sorting procedures revealed that 140 people in the sample of 597 had been contacted by the informational program. This is coverage of 23.45 per cent of the audience. Of these people, 117 were contacted by one medium, 21 were contacted by two media, and two were contacted by three media. No one in the sample was contacted by all four media--television, radio, newspaper, and the publication.

Of the 117 people contacted by one medium, 85 were contacted by television, 11 by radio, 5 by newspaper, and 16 by the publication. Some of the 140 people were contacted several times. Contacts by all media totaled 165 of which 103 were by television, 24 by radio, 12 by newspaper, and 26 by the publication.

Adequacy of Contact. Contact by the informational program was compared to criteria or standards found in the literature.

Television, owned by 90 per cent of Virginia households in 1964, was reported having the ability to reach as much as 23.6 per cent of its potential audience as long ago as 1953, on a national basis. In a metropolitan sample in 1955, television reached 20 per cent of the sample. This compares to the 14.24 per cent contact achieved in the primary study in 1966.

Radio, available in 92 per cent of all U. S. homes, reaches from three to five per cent of its potential audience, according to the literature. This medium contacted 1.84 per cent of the Richmond sample.

Daily newspapers are reported to be the primary source of news for Americans; as many as 90 out of 100 regularly see newspapers. The newspaper contact in the primary study was less than one per cent (.84%).

Popular news and feature magazines have a reach potential, and this was the basis for comparison of contact by the publication "Passport to a Better Life." The literature reported this potential from 60 per cent of the audience in one week to 80 per cent in two weeks. The publication contacted 2.68 per cent of its audience in one month, in the primary study.

Significance of Score Comparisons. Four dependent variables were scored from responses of people interviewed in the Richmond post-treatment sample. These variables were tested against 12 independent variables for significance of difference. Testing of these 48 comparisons yielded five significant t values at the 5 per cent level of probability; all other t values were not significant.

"Knowledge government" scores of people contacted by television were significantly higher than the scores of people who were not contacted by television.

"Attitude government" scores of people contacted by radio were significantly higher than the scores of people who were not contacted by radio.

"Attitude government" scores of people contacted by the newspaper were significantly higher than the scores of people who were not contacted by newspaper.

"Knowledge government" scores of all people exposed to any phase of the communications program were significantly higher than the scores of people who were not exposed to the planned communications program.

"Knowledge government" scores of people contacted by more than one medium were significantly higher than the scores of people who were contacted by only one medium.

## Conclusions

The general conclusion to be drawn from this sub-study is that the planned communications program failed to increase knowledge of and promote favorable attitudes toward chemical pesticides in the urban audience for which it was designed.

Specific conclusions are:

(1) Too few people (140 of 597) were contacted by the four mass media used in the total program. Contact of less than one fourth of an audience could not be expected to increase knowledge and promote favorable attitudes.

(2) Each medium fell short of achieving its potential reach in the sample. Compared to media coverage reported in the literature, both the individual and combined coverage in the Richmond sample by mass communications media were inadequate.

(3) The five significant differences in scores must remain unexplained. Information about the government's role in chemical pesticides was not emphasized to a greater degree than other elements of the informational program, yet significant differences appeared only in these categories. Significant differences were distributed without pattern, and in no obvious relationship to each other.

(4) There were no significant variations in pre-treatment and post-treatment scores of the Richmond "reinterview group," and likewise no significant variations in pre-treatment and post-treatment scores of the Roanoke "reinterview group." This observation supports validity of comparisons made within the sub-study.

## Recommendations

Designers of communications programs for Cooperative Extension's urban audience must take into account several aspects of communications.

First of these is timing. The urban consumer is preoccupied with school starting in September, or in October with preparing for fall and winter activities. It is in the spring when most people exhibit the desire and need for chemical pesticide information, not in late summer and early fall as it was presented by the informational program in the primary study.

Secondly, it is recommended that research be conducted before informational programs are designed for a specific audience, and be a continuing part of Extension's information effort. The primary study will provide vital audience information, and it is recommended this information be made available to guide designers of future informational programs.

Also, Extension's traditional methods of using mass media to reach Virginia's citizens should be evaluated. It is recommended that this evaluation be made in the context of current research results in all fields of communications, and for each medium used in existing programs.

Finally, it is recommended that buying prime space and time in commercial media be investigated as a means of getting Extension's message to the public effectively. High-quality in preparation and presentation should be a natural result, along with improving knowledge and attitude levels of the urban audience.

## Recommendations for Further Study

Results of this sub-study suggest other areas of investigation which might be undertaken within the primary study:

(1) an item analysis of certain questions in the interview schedule to ascertain listening habits of the urban audience in Virginia.

(2) A detailed survey of informational program content to indicate weaknesses and strengths of approaches used in the primary study.

(3) An investigation into methods of using mass media in the primary study to seek answers for such questions as: "Why was only one newspaper article printed in the month of the informational program?"; "Is free-choice distribution of publications an efficient method?"; "Is Extension information being broadcast only in public service time, which has little commercial value and hence little interest value?"; "Is the entertainment value of "Larry the Label" responsible for television's high level of contact in the Richmond sample, compared to the other media, or is this attributable to other factors?"

(4) An analysis of interviewing, coding, and scoring procedures employed in the primary study to determine the level of human error, and to establish correction factors for this error.

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# APPENDIX

Va. Coop. Extension Service
Virginia Polytechnic Institute

Budget Bureau No: 40 6673 0
Approval Expires: Dec. 31, 1966

Summer 1966

Address of respondent ______________________________

Date of interview ____________________ Interviewer's name ____________________

## CHEMICAL-PESTICIDE STUDY

I am representing the College of Agriculture of Virginia Polytechnic Institute which is making a study of the interests and needs of the people of Virginia in the use of pesticides on the farm, in the yard, and in the home.

When I say pesticides, I mean chemicals that are used to kill pests such as insects, weeds, plant diseases, rats, and mice.

1. Have you, yourself, ever used any pesticide? Yes (1) ☐ No (2) ☐

IF NO, SKIP TO INTRODUCTION TO QUESTION 3.

IF YES, ASK:

1a. To kill weeds? .............................. Yes (1) ☐ No (2) ☐

1b. To kill insects inside the house? ............ Yes (1) ☐ No (2) ☐

1c. To kill insects outside, on the lawn, in flowers, on vegetable garden? .................................. Yes (1) ☐ No (2) ☐

1d. To kill mice or rats? ........................ Yes (1) ☐ No (2) ☐

1e. To control plant diseases such as black spot on roses? ......................... Yes (1) ☐ No (2) ☐

IF YES TO 1a. ASK:

2. How often would you say you use weed killer? CHECK ONE

Less than once a year .......................... (1) ☐

Once or twice a year ........................... (2) ☐

Once a month during the growing season ....... (3) ☐

More than once a month during growing season ............................... (4) ☐

IF YES TO 1c. ASK:

2a. How often would you say you use insect killers outside the house? CHECK ONE

Less than once a year ........................ (1) ☐

Once or twice a year ........................ (2) ☐

Once a month during the growing season ....... (3) ☐

More than once a month during growing season ........................................ (4) ☐

As you perhaps know, farmers and public health workers use pesticides to control and destroy the weeds and insects that attack plants, animals, and people. Some people have expressed concern over the possible dangers of the use of such pesticides.

3. Have you ever seen this matter - possible dangers of the use of pesticides - discussed on T.V.?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

4. Have you ever heard this matter discussed on the radio?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

5. Have you ever read about it in magazines or books?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

6. Have you ever discussed it with relatives or members of the family?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

7. Did your friends ever bring this subject up in a conversation?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

8. Have you ever attended a group meeting where such a concern was the topic of discussion?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

9. KGT Are foods checked for the presence of pesticides before they are sold?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

IF NO OR DON'T KNOW - SKIP TO QUESTION 10.

IF YES, ASK:

9a. KGT You mean all foods? ............................(1) ☐

Or some foods? ..................................(2) ☐

9b. KGT Will you look at this card (A) and tell me who from this list does the checking?

CHECK ALL THAT APPLY.

1. Grower ............... ☐
2. Federal Government .. ☐
3. The store ........... ☐
4. State government .... ☐
5. Wholesaler .............. ☐
6. Other (Specify) ______________
7. Don't know .............. ☐

IF YES TO FEDERAL GOVERNMENT, ASK:

9c. KGT Do you know which department or agency in the Federal Government is responsible for doing the checking?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9d. KGT Which ones?

USDA (1) ☐ HEW (FDA) (2) ☐ Other (3) ☐

IF YES TO STATE GOVERNMENT, ASK:

9e. KGT Do you know which Department or agency in the State Government is responsible for doing the checking?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9f. KGT Which ones?

Virginia Dept. of Agr. ☐ Others ☐

9g. KGT Are there any Federal laws controlling the amount of pesticides that may be in food?

Yes (1) ☐ No (2) ☐ Not Sure (3) ☐

IF YES TO ABOVE, ASK:

9h. KGT What are the names of the laws?

______________________________________________

______________________________________________

______________________________________________

10. AGT Do you believe that the government is doing all it can to adequately protect you from possible poisoning by pesticides?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

11. KGT Will you look at this card (B) and tell me which of the items you believe to be correct?

Federal government control of pesticides includes:

a. Direct supervision of pesticide manufacturing and packaging plants .................................... ☐

b. Allowing sale only if pesticide can be used safely ................................................ ☐

c. Allowing sale only if pesticide does what the manufacturer says it will ........................... ☐

d. Permitting sale of the most poisonous pesticides only to farmers .................................. ☐

e. Control of statements on pesticide label ................ ☐

f. Setting retail prices of pesticides ..................... ☐

g. Don't know ............................................... ☐

h. No control ............................................... ☐

IF g. OR h. IS CHECKED, SKIP TO QUESTION 13.

12. Will you look at this card (C) and tell me which of these things the Government should do?
ACT

CHECK ONLY ONE

Remove all controls on the use of pesticides ............ (1) ☐

Remove some controls on the use of pesticides ........... (2) ☐

Leave all controls as they are ........................... (3) ☐

Put some more controls on the use of pesticides ......... (4) ☐

Put a lot more control on the use of pesticides ......... (5) ☐

Don't know ..................................... (6) ☐

13. Do manufacturers warn users when their pesticide is poisonous?

Yes (1) ☐ No (2) ☐ Don't know (3) ☐

IF YES, ASK:

13a. When they do warn users, how do they do it?

On the label (1) ☐ Other (2) ☐ Don't know (3) ☐

IF THE RESPONDENT ANSWERED NO TO QUESTION 1 ON PAGE 1 (NEVER USED ANY PESTICIDES) NOW SKIP TO QUESTION 25.

14. When you use a pesticide which you have used before, do you read the label, or do you remember how to use it without reading it again?

Read (1) ☐ Remember how (2) ☐ Other (3) ☐

15. Are there any particular directions on labels you can't understand or follow?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES, ASK:

15a. Can you tell me what some of them are?

________________________________________

________________________________________

________________________________________

16. Do you happen to know what word is used to describe the amount of pesticide allowable by law in food or food products?

Tolerance (1) ☐ Other answer (2) ☐ Don't know (3) ☐

17. Where do you keep pesticides when you are not using them?

CHECK AS MANY AS APPLY

- a. In the garage ............ ☐
- b. In a garden tool shed .... ☐
- c. In the kitchen ........... ☐
- d. In the basement ....... ☐
- e. Other (Specify) ____________

18. Would you say that all, most, some, or none are stored out of reach of children or pets?

All (1) ☐ Most (2) ☐ Some (3) ☐ None (4) ☐

19. Are all, most, some, or none stored under lock and key?

All (1) ☐ Most (2) ☐ Some (3) ☐ None (4) ☐

20. Have you ever used aerosol bombs containing pesticides?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 21

IF YES, ASK:

20a. What do you do with them when they are empty? CHECK AS MANY AS APPLY

- a. Throw in trash pick-up ...................... ☐
- b. Burn ........................................ ☐
- c. Throw away .................................. ☐
- d. Bury ........................................ ☐
- e. Other (Specify) ______________________________

21. What do you do with empty containers of pesticides other than aerosol bombs? CHECK AS MANY AS APPLY

- a. Burn, if paper bag .......................... ☐
- b. Throw in trash pick-up ...................... ☐
- c. Bury ........................................ ☐
- d. If bottles, wash and use for storage of other liquids ..................... ☐
- e. Other (Specify) ______________________________
- f. Don't use ................................... ☐

22. What do you do with left-over pesticide spray material?
CHECK AS MANY AS APPLY

a. Dump on ground ☐

b. Leave in sprayer for next time ☐

c. Pour down drain ☐

d. Keep in a container, but not in sprayer ☐

e. Don't have any left over - make just what is needed ☐

f. Other (Specify) ____________________

g. Have never used a pesticide in a sprayer ☐

23. Will you look at this card (D) and tell me which of these ways help you decide which pesticide to buy? CHECK AS MANY AS APPLY

a. Advertisement:

    (a) In newspaper ☐
    (b) On TV ☐
    (c) On radio ☐
    (d) In magazine ☐

b. Ask a friend ☐

c. Ask the Extension agent (county agent) ☐

d. Ask the storekeeper or clerk ☐

e. Ask a nurseryman ☐

f. Ask V.P.I. (Va. Tech) ☐

g. Ask the State Department of Agriculture ☐

h. Look through the various pesticides on the shelf at the store ☐

i. Read about the correct pesticide in a book, magazine, or recommendation sheet ☐

j. Use the one I have used for years ☐

k. Family member told me what to buy ☐

l. Other (Specify) ____________________

m. I don't buy them ☐

24. Will you look at this card (E) and tell me which of these methods you use to find out how to use a pesticide? CHECK AS MANY AS APPLY

a. Ask a friend ........................................ ☐

b. Recall what I have read about it .................. ☐

c. Read the instructions printed on the package ........ ☐

d. Ask the person who sold it to me .................. ☐

e. Ask the county agent ................................ ☐

f. Ask a nurseryman ................................... ☐

g. Look in bulletin or article I have seen about the pesticide ................................ ☐

h. Ask a family member ................................ ☐

i. Other (Specify) ______________________________

25. I have some books listed here. As I name each one, will you tell me whether you have heard of it, whether you have read it, and whether it discusses pesticides?

| | Heard of? | Read? | Discusses Pesticides? |
|---|---|---|---|
| a. DEERSLAYER by James Fenimore Cooper .......... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |
| b. SILENT SPRING by Rachel Carson .......... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |
| c. TO KILL A MOCKINGBIRD by Harper Lee ....... | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |
| d. BUGS OR PEOPLE? by Wheeler McMillen ........ | Yes (1) ☐ | Yes (1) ☐ | Yes (1) ☐ |
| | No (2) ☐ | No (2) ☐ | No (2) ☐ |
| | | | DK (3) ☐ |

26. AG What effect do you think the use of pesticides has on the quality of foods produced: Improves quality, lowers quality, or has no effect?

Improves quality .................................... (1) ☐

No effect ........................................... (2) ☐

Lowers quality ...................................... (3) ☐

Improves some, lowers others ........................ (4) ☐

Don't know .......................................... (5) ☐

27. AG I have a short list of items here. As I read each one, will you tell me whether you think it is one of the results of the use of pesticides?

| | Yes (1) | No (2) | Don't know (3) |
|---|---|---|---|
| a. Control of malarial mosquitoes ............... | ☐ | ☐ | ☐ |
| b. Reduction of amount of sleeping sickness (equine encephalitis) ..... | ☐ | ☐ | ☐ |
| c. Reduction of the number of fish in some places or areas .................. | ☐ | ☐ | ☐ |
| d. Control of fleas and flies that carry disease ............. | ☐ | ☐ | ☐ |
| e. Reduction in the number of birds .......... | ☐ | ☐ | ☐ |

28. Will you look at all the items on this card (F), and then tell me which you think are the most significant or important effects of pesticides?
AC

DO NOT CHECK ALL - CHECK ONLY MOST IMPORTANT

a. Kill ants ☐
b. Protect apples from insects ☐
c. Kill harmful bugs on food crops ☐
d. Kill bugs on roses ☐
e. Harm children and pets ☐
f. Kill fish ☐
g. Kill mosquitoes ☐
h. Upset nature ☐
i. Harm people using them ☐
j. Kill robins ☐
k. Protect shrubs from disease ☐
l. Kill starlings ☐
m. Kill weeds in lawn ☐
n. None is important ☐

29. Will you look at this card (G) and tell me whether you think the use of weed killers by farmers helps produce any of the listed results?
AG

CHECK AS MANY AS APPLY:

- a. More food ................ ☐
- b. Less food ................ ☐
- c. More expensive food ..... ☐
- d. Cheaper food ............ ☐
- e. Better food ............ ☐
- f. Food dangerous to eat ................ ☐
- g. None of these .......... ☐
- h. Don't know ............. ☐

30. In general, do you feel pesticides make it easy for a person:

| | | | |
|---|---|---|---|
| a. To control insects or bugs? .............. | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| b. To control weeds? ................. | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| c. To control plant diseases? ........ | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |
| d. To control rats and mice? ......... | Yes (1) ☐ | No (2) ☐ | DK (3) ☐ |

31. Will you look at this card (H)? Do you believe any of these people are in any danger from the use of pesticides?
KG

CHECK AS MANY AS APPLY.

| | QUESTION 31 | QUESTION 31a |
|---|---|---|
| a. The people who make the pesticides ........................ | ☐ | ☐ |
| b. Applicators (farmers or commercial persons who put the pesticides on) ............ | ☐ | ☐ |
| c. Harvesters of food ................ | ☐ | ☐ |
| d. Retail dealers (handlers, salesmen, warehousemen) ........... | ☐ | ☐ |
| e. Consumers who eat food treated with pesticides ........... | ☐ | ☐ |
| f. None is in danger ................. | ☐ | ☐ |

IF MORE THAN ONE WAS CHECKED FOR 31, ASK:

31a. Which one do you believe was exposed to the greatest risk?
KG

CHECK ABOVE

IF b. for 31 (APPLICATORS) WAS NOT CHECKED - SKIP TO QUESTION 33.

32. If a farmer carefully follows the manufacturer's directions for use of pesticides, do you feel there is any danger to him?
KG

Yes (1) ☐ No (2) ☐ Don't Know (3) ☐

IF YES,

32a. Would you say a great deal, some, or a very little?
KG

A great deal (1) ☐ Some (2) ☐ Very little (3) ☐

33. What do *you* usually do before eating a raw apple or pear? CHECK ONLY ONE

Peel it .............................. (1) ☐
Wash it or rinse it .................... (2) ☐
Wipe it off ........................... (3) ☐
Nothing .............................. (4) ☐ SKIP TO QUESTION 34.

33a. Why do you do it?

______________________________________________________________

______________________________________________________________

______________________________________________________________

34. Do you think in Richmond/Roanoke there are fewer birds than there used to be, more birds, or about the same number as always?

Fewer birds than there used to be .................... (1) ☐
More birds than there used to be ..................... (2) ☐
About the same number as always ...................... (3) ☐
Don't know ........................................... (4) ☐

IF FEWER, ASK:

34a. Why do you think there are fewer?

______________________________________________________________

______________________________________________________________

35. Do you feel that pesticide sprays and dusts endanger wildlife that
KG may come into contact with them?

Yes (1) ☐ No (2) ☐ Don't Know (3) ☐

IF YES,

35a. Would you say: A great deal, some, very little, or none?
KG

A great deal (1) ☐ Some (2) ☐ Very little (3) ☐

36. I am going to read a number of statements which one might hear concerning pesticides or their use. For each one, as I read it, will you indicate whether you Strongly Agree (SA) with the statement, Agree (A), are Undecided (U), Disagree with it (D), or Strongly Disagree (SD). These responses are listed on this card.

HAND RESPONDENT CARD (I).

Please consider each statement by itself and in its entirety when expressing your opinion.

AG a. In order to continue to produce an abundant supply of food, farmers must use pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG b. If pesticides were not used, people would be healthier and happier.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG c. The use of pesticides has done little to control the spread of pests.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG d. There is little reason to fear pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ Sd (5) ☐

No Opinion (6) ☐

KG e. If pesticides are used properly, people can avoid any harm from them.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

ACT f. Farmers should be allowed to use pesticides as they choose.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

AG g. If pesticides were not used, the American people might become short of food.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

KG h. There have been deaths due to poor handling of pesticides.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

KG i. Pesticides should not be put in unlabeled bottles or bags.

SA (1) ☐ A (2) ☐ U (3) ☐ D (4) ☐ SD (5) ☐

No Opinion (6) ☐

37. In general, do you feel pesticides are pretty dangerous to work with?

Yes (1) ☐ No (2) ☐ No opinion (3) ☐

38. ACT Do you think that certain pesticides should be available only on a prescription basis, like many medicinal drugs for people?

Yes (1) ☐ No (2) ☐ No opinion (3) ☐

39. I would like to ask you how concerned you think various people or groups are about the possible harmful effects from the use of pesticides.

Here is a card (J) with a listing of degrees of concern that I would like you to use in answering my questions.

HAND CARD TO RESPONDENT AND READ CARD.

| | Not concerned about the effects (1) | A little concerned (2) | Quite concerned (3) | Very much concerned (4) | Don't know (5) |
|---|---|---|---|---|---|
| First of all how concerned are you? ....... | ☐ | ☐ | ☐ | ☐ | ☐ |
| How concerned are: | | | | | |
| The general public ............... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Chemical Manufacturers .......... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Congress ............... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Food & Drug Administration ......... | ☐ | ☐ | ☐ | ☐ | ☐ |
| U.S. Dept. of Agriculture ........... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Va. Dept. of Agriculture ............ | ☐ | ☐ | ☐ | ☐ | ☐ |
| State legislators ...... | ☐ | ☐ | ☐ | ☐ | ☐ |
| V.P.I. (Va. Tech) ...... | ☐ | ☐ | ☐ | ☐ | ☐ |
| Extension agents ....... | ☐ | ☐ | ☐ | ☐ | ☐ |

40. Are the following of serious concern to you?

a. Pollution of the air by smoke .............. Yes (1) ☐ No (2) ☐ No opinion (3) ☐

b. Foreign relations ..... Yes (1) ☐ No (2) ☐ No opinion (3) ☐

c. Contamination from radioactive fallout .............. Yes (1) ☐ No (2) ☐ No opinion (3) ☐

d. Inflation ............ Yes (1) ☐ No (2) ☐ No opinion (3) ☐

e. Pollution of Virginia rivers and streams .... Yes (1) ☐ No (2) ☐ No opinion (3) ☐

We have a few other questions to ask which will provide us with information that will help us tabulate and analyze the data.

DO NOT ASK QUESTION 41

41. Sex:

Male (1) ☐ Female (2) ☐

42. How many children under 15 years of age live here?

CHECK ONE

0 (1) ☐ 1-3 (2) ☐ 4 or more (3) ☐

43. Do you have any pets?

CHECK AS MANY AS APPLY

a. Dogs ........................... ☐

b. Cats ........................... ☐

c. Birds ........................... ☐

d. Fish ........................... ☐

e. Other (Specify) ____________________

f. None ........................... ☐

44. Where did you live most of your life before you were 18? (READ RESPONSES)

On a farm or ranch, ........................................ (1) ☐

In the country but not on a farm, ........................ (2) ☐

In a town under 2,500, or ................................. (3) ☐

In a city? ................................................ (4) ☐

45. What is your occupation? We would like you to be specific.

TELEPHONE LINEMAN, RATHER THAN WORK FOR THE TELEPHONE COMPANY.

______________________________________________

______________________________________________

46. What is your age?

15-19 .................................................. (1) ☐

20-29 .................................................. (2) ☐

30-39 .................................................. (3) ☐

40-49 .................................................. (4) ☐

50-59 .................................................. (5) ☐

60-69 .................................................. (6) ☐

70 & over .............................................. (7) ☐

47. What is the highest grade in school you had an opportunity to complete? CHECK

| Elementary | | | High School | | College | | Beyond College |
|---|---|---|---|---|---|---|---|
| 1 - 4 years (1) | 5 - 6 years (2) | 7 - 8 years (3) | 1 - 3 years (4) | 4 years (5) | 1 - 3 years (6) | 4 years (7) | (8) |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

48. Have you had, in addition to the above, at least a school-year of training in business, nursing, or other technical specialty?

Yes (1) ☐ No (2) ☐

49. Have you purchased a fishing or hunting license during the last three years?

Yes (1) ☐ No (2) ☐

50. Now we would like to ask about some of the special interests you have. For each of the interests I name, will you tell me if you participate in it or have only general interest in it, or have no interest in it?

| | I participate (1) | General interest (2) | No interest (3) |
|---|---|---|---|
| a. Bird watching | ☐ | ☐ | ☐ |
| b. Boating | ☐ | ☐ | ☐ |
| c. Camping | ☐ | ☐ | ☐ |
| d. Collecting insects | ☐ | ☐ | ☐ |
| e. Discussion groups | ☐ | ☐ | ☐ |
| f. Fishing | ☐ | ☐ | ☐ |
| g. Flower arranging | ☐ | ☐ | ☐ |
| h. Golf | ☐ | ☐ | ☐ |
| i. Hiking | ☐ | ☐ | ☐ |
| j. Hunting | ☐ | ☐ | ☐ |
| k. Nature study | ☐ | ☐ | ☐ |
| l. Raising flowers | ☐ | ☐ | ☐ |
| m. Reading books | ☐ | ☐ | ☐ |
| n. Swimming | ☐ | ☐ | ☐ |
| o. Vegetable gardening | ☐ | ☐ | ☐ |

51. We need to know some of your interests and participation in certain organizations during the past 12 months. For each of the organizations named will you tell me: a. Were you a member? b. Did you usually attend meetings? c. Did you serve on any committees? d. Did you hold any offices?

| | CHECK IF YES | | | |
|---|---|---|---|---|
| | a. Member | b. Usually attended meetings | c. Served on committee | d. Held office |
| PTA ............... | ☐ | ☐ | ☐ | ☐ |
| Audubon ............ | ☐ | ☐ | ☐ | ☐ |
| Garden Club ........ | ☐ | ☐ | ☐ | ☐ |
| Rotary ............. | ☐ | ☐ | ☐ | ☐ |
| Kiwanis ............ | ☐ | ☐ | ☐ | ☐ |
| Lions .............. | ☐ | ☐ | ☐ | ☐ |
| Toastmasters ....... | ☐ | ☐ | ☐ | ☐ |
| A sportsman club (Specify) ________ | ☐ | ☐ | ☐ | ☐ |
| Home Demonstration Club ............... | ☐ | ☐ | ☐ | ☐ |
| AAUW ............... | ☐ | ☐ | ☐ | ☐ |
| League of Women Voters ............. | ☐ | ☐ | ☐ | ☐ |

52. Do you have a working radio? Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 59.

53. When do you (RESPONDENT) usually listen to the radio? CHECK ONE OR MORE.

a. 5-9 a.m........... ☐
b. 9-12 noon ........ ☐
c. 12-1 p.m.......... ☐
d. 1-6 p.m............ ☐
e. 6-12 p.m........... ☐
f. Don't usually listen to ......... ☐
g. Don't ever listen to radio .......... ☐

IF DON'T USUALLY LISTEN, SKIP TO QUESTION 55.

IF DON'T EVER LISTEN, SKIP TO QUESTION 59.

54. What stations do you usually listen to? INSERT STATION CALL LETTERS

______________________________________________

______________________________________________

IF 53 c. (From 12-1 p.m.) WAS CHECKED, SKIP TO QUESTION 56a.

55. Do you ever listen to the radio between 12 noon and 1:00 p.m. on week-days?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 57.

IF YES, ASK QUESTION 56 and SKIP QUESTION 56 a.

56. How often?

| | QUESTION 56 | QUESTION 56a |
|---|---|---|
| Every day (4 to 5 times a week) .................................. | (1) ☐ | (1) ☐ |
| 2-3 times a week ........................ | (2) ☐ | (2) ☐ |
| Once a week to once every two weeks ........................ | (3) ☐ | (3) ☐ |
| Less than twice a month .................. | (4) ☐ | (4) ☐ |

56a. How often do you listen between 12 noon and 1:00 p.m. on week-days? CHECK ABOVE.

57. During the last month or so, do you remember hearing anything on the radio about?

| | Yes (1) | No (2) | Don't remember (3) |
|---|---|---|---|
| Medicare? ...................... | ☐ | ☐ | ☐ |
| Pesticides? ................. | ☐ | ☐ | ☐ |
| Vietnam? .................... | ☐ | ☐ | ☐ |
| Hungary? .................... | ☐ | ☐ | ☐ |
| Irish Rebellion? ............ | ☐ | ☐ | ☐ |
| Civil Rights? ............... | ☐ | ☐ | ☐ |

IF YES TO PESTICIDES, ASK:

57a. You said you heard something about pesticides in the past month or so. What were they talking about?
*

______________________________________________

______________________________________________

______________________________________________

58. Have you heard a radio program from V.P.I. (Va. Tech) in the past month or so?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

59. Do you have a working television?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 67.

60. When do you (RESPONDENT) usually watch TV? CHECK ONE OR MORE

- a. 5-7 a.m. .................................. ☐
- b. 7-10 a.m. .................................. ☐
- c. 10-12 noon .................................. ☐
- d. 12-4 p.m. .................................. ☐
- e. 4-6 p.m. .................................. ☐
- f. 6-8 p.m. .................................. ☐
- g. after 8 p.m. .................................. ☐
- h. Don't usually watch TV .................. ☐
- i. Don't ever watch TV ..................... ☐

IF DON'T USUALLY WATCH, SKIP TO QUESTION 62.

IF DON'T EVER WATCH, SKIP TO QUESTION 67.

61. What stations do you usually watch? INSERT CHANNEL NUMBERS

______________________________________________

62. Do you ever watch TV at 6:30 a.m. on week days?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 63.

IF YES,

62a. How often?

Every day (4 to 5 times a week) .................. (1) ☐

2-3 times a week .................................. (2) ☐

Once a week to once every two weeks ...................................... (3) ☐

Less than twice a month ......................... (4) ☐

63. During the past month or so do you remember having seen any programs on:

| | Yes (1) | No (2) | Don't remember (3) |
|---|---|---|---|
| a. Medicare? .......... | ☐ | ☐ | ☐ |
| b. Pesticides? ......... | ☐ | ☐ | ☐ |
| c. Vietnam? ............ | ☐ | ☐ | ☐ |
| d. Hungary? ............ | ☐ | ☐ | ☐ |
| e. Irish Rebellion? .... | ☐ | ☐ | ☐ |
| f. Civil rights? ....... | ☐ | ☐ | ☐ |

IF YES TO PESTICIDES, ASK:

64. * What was the pesticide program about, if you remember?

______________________________________________

______________________________________________

65. * Have you seen a program from V.P.I. in the past month or so?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES,

65a. What was it about?

______________________________

______________________________

66. * Have you ever seen a spot announcement on TV with a cartoon character that looks like this?

SHOW CARD (K) WITH LARRY THE LABEL PICTURE

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF YES,

66a. What was or were the announcement(s) about?

______________________________

______________________________

______________________________

66b. Do you happen to remember the character's name?

______________________________

67. Do you get a daily newspaper?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 68.

IF YES, ASK:

67a. Which one (s) do you get?

______________________________

______________________________

67b. Do you usually look through the newspaper?

Yes (1) ☐ No (2) ☐

IF NO, SKIP TO QUESTION 68.

IF YES, ASK:

67c. How often is usually?

Every day (5-6 days) .......................... (1) ☐

2-4 times a week .............................. (2) ☐

Once a week to once
every two weeks ............................... (3) ☐

Less than twice a month ....................... (4) ☐

67d. Which sections do you usually read when you have time?

a. Front page news .............................. ☐

b. Sports ....................................... ☐

c. Society ...................................... ☐

d. Garden section ............................... ☐

e. Comics ....................................... ☐

f. "Dear Abby" .................................. ☐

g. State-local news ............................. ☐

h. Editorials ................................... ☐

i. Columnists ................................... ☐

j. Other (Specify) ______________________________

68. Do you get a Sunday paper?

Yes (1) ☐ No (2) ☐

IF NO SKIP TO QUESTION 69.

IF YES, ASK:

68a. Which ones do you get?

______________________________________________

______________________________________________

______________________________________________

68b. Do you usually look through it?

Yes (1) ☐   No (2) ☐

IF NO SKIP TO QUESTION 69.

IF YES, ASK:

68c. How often is usually?

Every week ........................................ (1) ☐

1-3 times a month ................................. (2) ☐

Less than once a month ........................ (3) ☐

68d. Which sections do you usually read when you have time?

a. Front page news ................................ ☐

b. Sports ............................................... ☐

c. Society ............................................. ☐

d. Garden section ................................. ☐

e. Comics ............................................. ☐

f. "Dear Abby" ...................................... ☐

g. State-local news ............................... ☐

h. Editorials .......................................... ☐

i. Columnists ........................................ ☐

j. Other (Specify) ________________________

69. Have you read any articles on pesticides in a newspaper during the past month or so?

Yes (1) ☐   No (2) ☐   Don't remember (3) ☐

IF YES, ASK:

69a. What was it about?
*

________________________________________

________________________________________

________________________________________

HAND RESPONDENT PAMPHLET

70. Have you ever seen this pamphlet?
*

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

IF NO OR DON'T REMEMBER - INTERVIEW ENDS

IF YES, ASK:

70a. Where did you see it?

______________________________________________

______________________________________________

70b. Have you read this pamphlet?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

70c. Do you have a copy of this pamphlet?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

70d. Have you ever told anyone else about this pamphlet, or shown it to anyone?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

70e. Have you discussed it with anyone?

Yes (1) ☐ No (2) ☐ Don't remember (3) ☐

# VITA

The author was born March 2, 1930 in Salida, Colorado, and attended public schools there through his sophomore year. In 1947 he moved with his family to Wyoming, where he was graduated from Cheyenne High School in June 1948. He entered Wyoming University, Laramie, in 1948 and received the Bachelor of Science Degree in Journalism in June 1953.

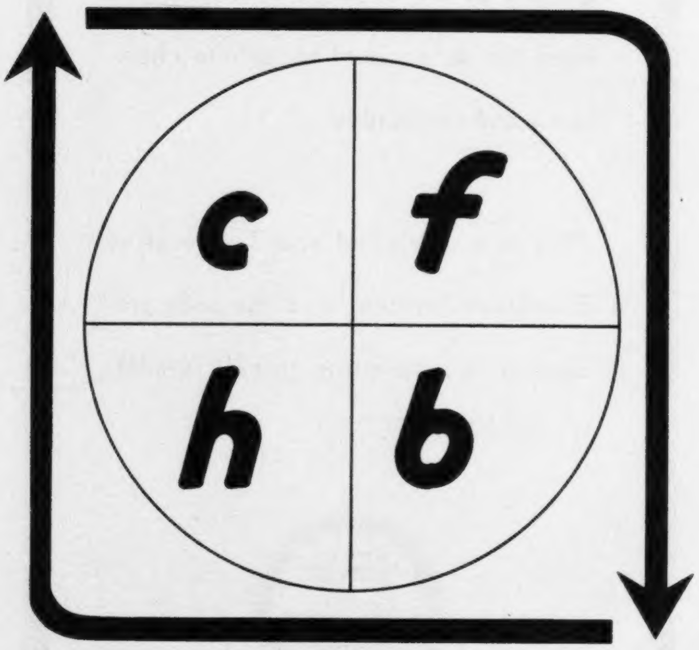
From January 1951 until February 1952 he served on active naval reserve duty with U. S. Fleet Activities, Sasebo, Japan.

From June 1953 until October 1955 the author worked as assistant editor at the weekly Pinedale Roundup, Pinedale, Wyoming. He was next employed with two commercial printers in Laramie, where he worked until accepting the position of Associate Extension Editor (Publications) at Virginia Polytechnic Institute in September 1962. He also served in the positions of Editor, Head of Agricultural Information, Director of Publications and Visual Aids, and Information Project Leader until April 30, 1968. At this time he resigned to accept a position to edit research publications with the U. S. Forest Service, Asheville, North Carolina.

The author commenced graduate study in Extension Education in January 1965 as a part-time student and full time staff member. He expects to receive the Master of Science Degree in June 1968.

He married Joan Phyllis Leenhouts in Casper, Wyoming in 1952. They are the parents of three daughters, aged 14, 12 and three.

## Appendix E



# PASSPORT

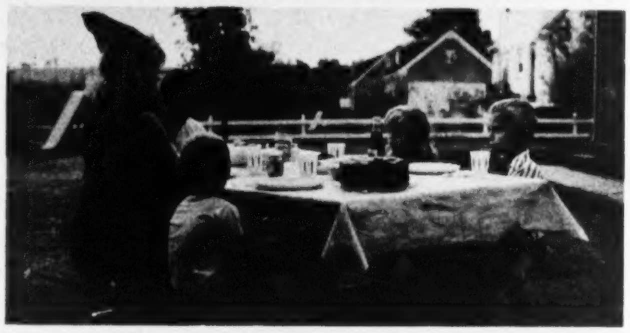
## TO A BETTER LIFE

This brochure has been prepared by specialists of the Extension Pesticide-Chemical Program at Virginia Polytechnic Institute. It attempts to gather, in one place, information you need for safe use of household chemicals and pesticides.

This is a service of your Cooperative Extension Service, and the only product it is attempting to sell is safety–YOUR SAFETY!!!

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U. S. Department of Agriculture. W. E. Skelton, Director of Extension Service, Virginia Polytechnic Institute, Blacksburg, Virginia 24061.

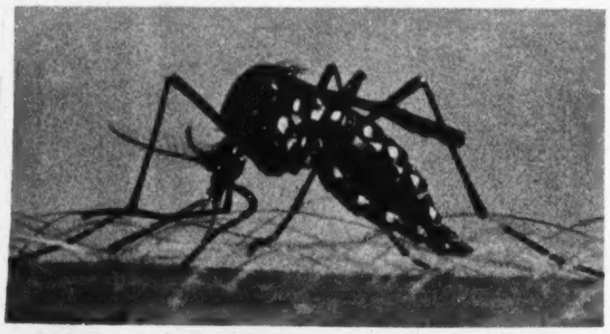
# A LIFE WITHOUT HUNGER

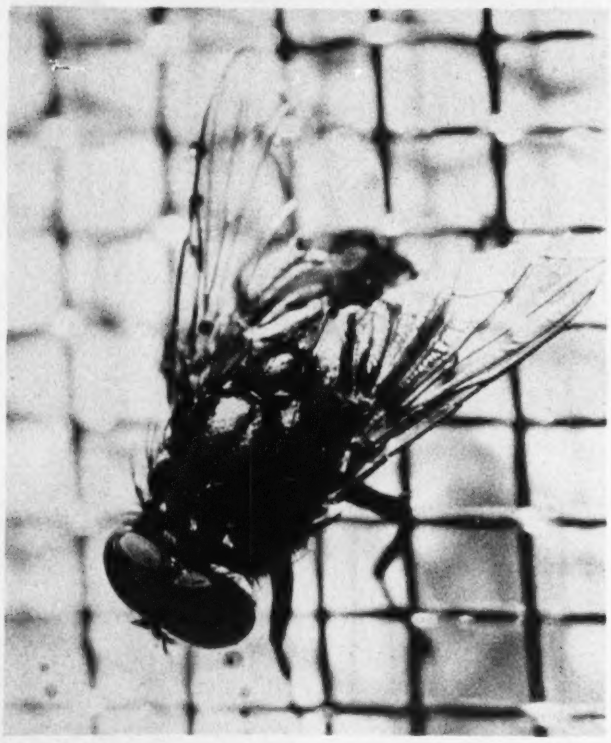


Had your three square meals today? Odds are if you haven't, you will before bedtime. Odds are, too, that without pesticides you wouldn't have eaten so well today, or been able to afford foods that were available.

If you have a garden, you know that for every crop there seems to be 50 pests! Multiply the problems in your home garden manyfold and you see what farmers face. It would be impossible to produce commercially acceptable fruits, vegetables, meats, and dairy products today without using pesticides.

# A LIFE WITHOUT DISEASE



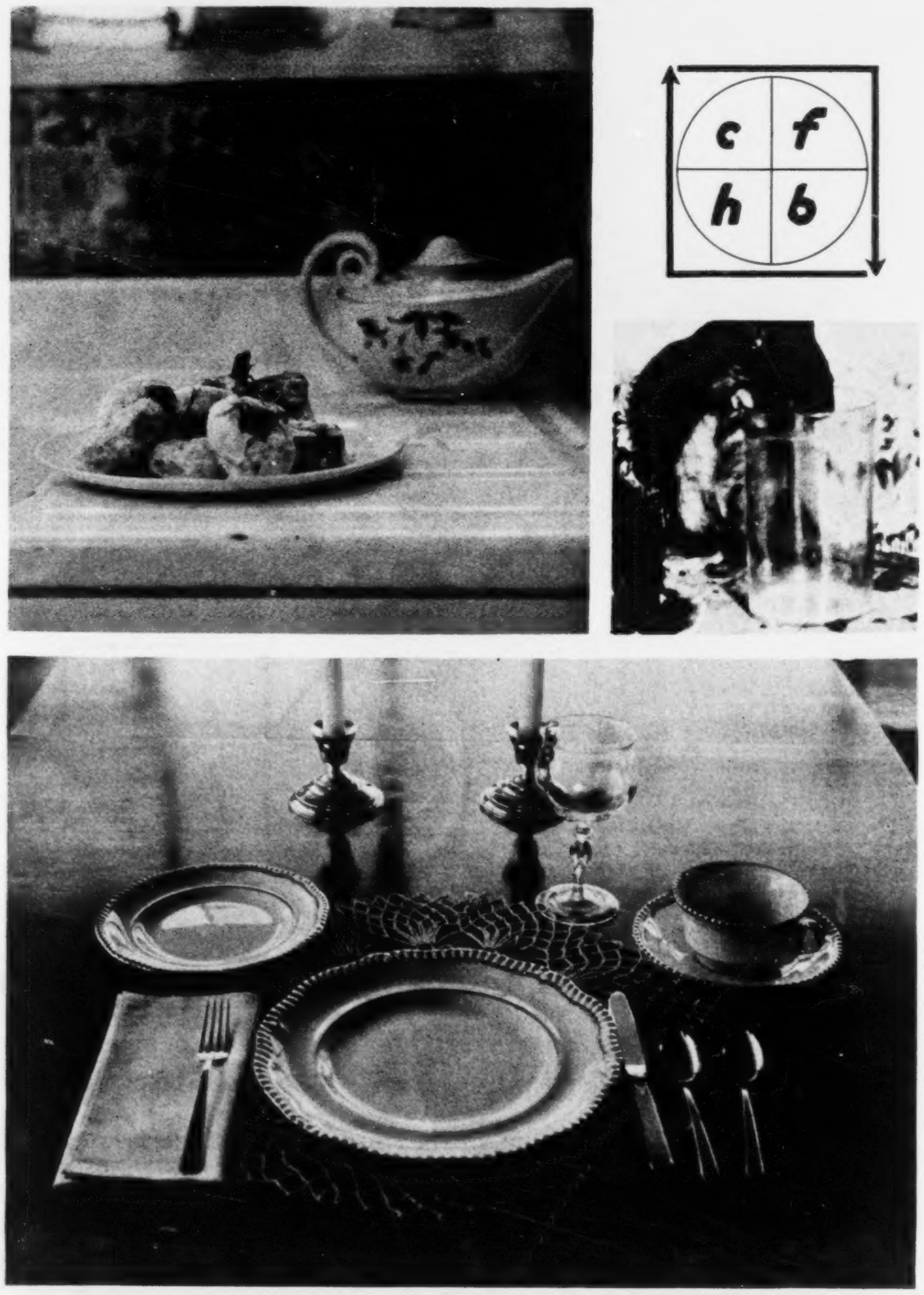


Pesticides are needed for health.

There are those alive who can remember when malaria and yellow fever stalked this land! Both diseases are spread by mosquitoes, and pesticides have helped control these pests.

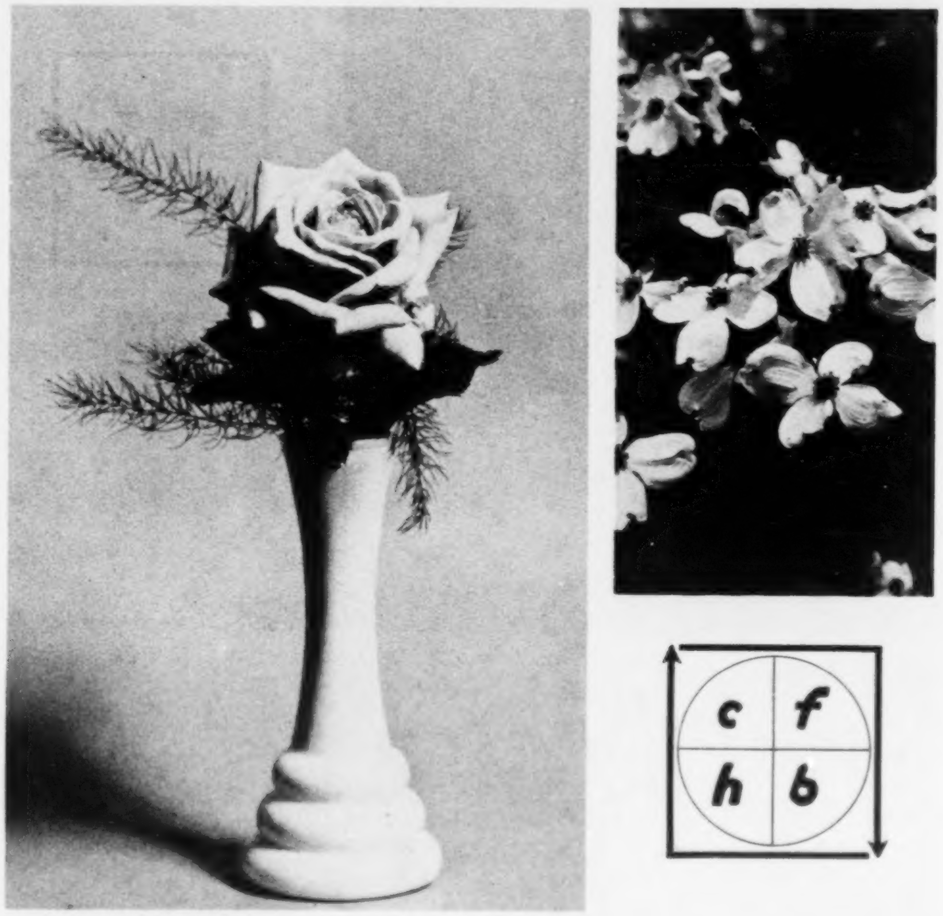
Encephalitis, or sleeping sickness, which occurs in the Tidewater and Coastal regions of Virginia is also carried by mosquitoes. The only defense is control of mosquitoes--and pesticides are our most effective weapon. Disease-spreading flies are also controlled with pesticides.

# A LIFE OF CLEANLINESS



In most homes, there's usually room for one more. But there's no room if that 'one more' is a rat, mouse, fly, cockroach, ant, or termite! Most homemakers frown on this sort of company. Again, it's pesticides that come to our rescue.

# A LIFE OF NATURAL BEAUTY



Pesticides contribute to beauty.

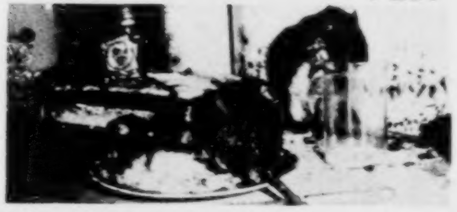
There are pests outside the home that we can't tolerate, either. Weeds, dandelions, crabgrass, Japanese beetles, rose chafers, aphids, ants, mosquitoes, mice--the list is endless!

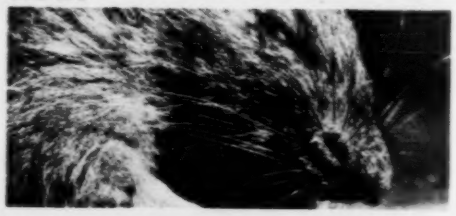
Without the use of pesticides there would be more hoeing and digging of weeds and more picking off of bugs than most of us want to think about.

MORAL OF THIS STORY--IF WE WANT TO CONTINUE TO LIVE IN THE STYLE TO WHICH WE HAVE BECOME ACCUSTOMED, PESTICIDES ARE NECESSARY TO CONTROL PESTS THAT WANT TO EAT OUR FOOD, THREATEN OUR HEALTH, LIVE IN OUR HOMES, AND TAKE POSSESSION OF OUR GARDENS AND LAWNS.

# WHAT ARE PESTICIDES?

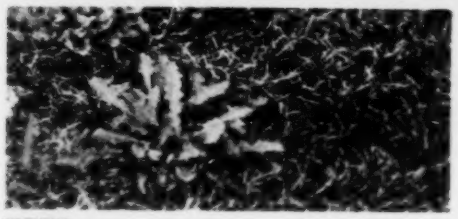
### PEST I CIDES


RODENT


KILLER

INSECT

KILLER


WEED

KILLER

Pesticides (cide=to kill--pest killers) are chemicals used around the home, on the farm, in forests, or in streams to control undesirable plants, diseases, insects, or rodents.

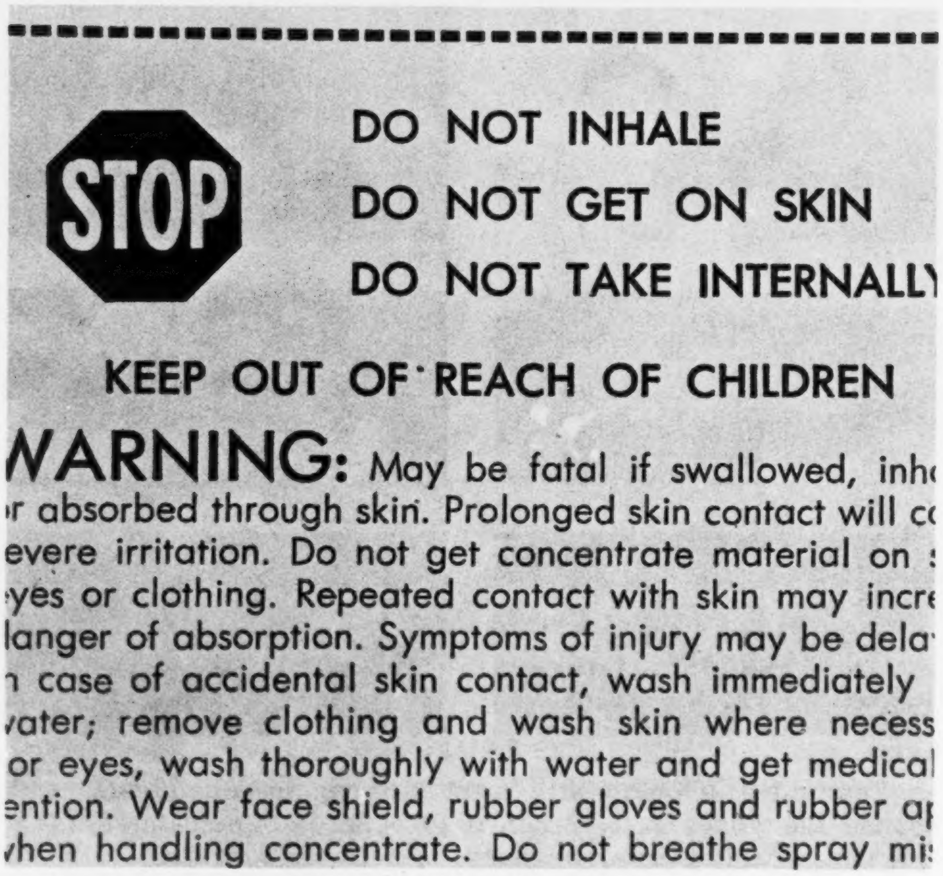
The term identifies chemicals specifically designed for killing: insects-insecticides, weeds-herbicides, mice and rats-rodenticides, plant molds (fungus)-fungicides, mites-miticides, worms (nematode)-nematocides.

## PESTICIDES NOT PEOPLECIDES

Pesticides, improperly used, may become peoplecides! It may be bad English, but it's worth remembering--because pesticides are poisons that kill! While they are tested and approved for use, pesticides are safe ONLY if used in accordance with directions!

The sorry fact is, however, that too many Americans operate on the theory: "directions are meant for the other fellow to read and follow. If one tablespoon is good, two or three tablespoons should be even better." Such a theory just doesn't work with pesticides.

# USE PESTICIDES SAFELY



DO NOT INHALE
DO NOT GET ON SKIN
DO NOT TAKE INTERNALL

KEEP OUT OF REACH OF CHILDREN

ARNING: May be fatal if swallowed, inh
r absorbed through skin. Prolonged skin contact will c
evere irritation. Do not get concentrate material on
yes or clothing. Repeated contact with skin may incr
langer of absorption. Symptoms of injury may be dela
case of accidental skin contact, wash immediately
ater; remove clothing and wash skin where necess
or eyes, wash thoroughly with water and get medical
ention. Wear face shield, rubber gloves and rubber a
hen handling concentrate. Do not breathe spray mi

You can use pesticides safely if you read and follow directions on the label. The label tells how much to use, what to use it on, what not to use it on, and how to use it. Follow the directions and you'll do the job effectively and stay out of trouble. You will also maintain your peace of mind when you know you have done the job right!

# WHICH PESTICIDE TO USE

There are experts who can help you with pest problems! They can help you identify the pest, decide on the best and cheapest material to use for control, and inform you how to use it safely.

Those who can help include: Cooperative Extension agents, nurserymen, lawn and landscaping specialists, state land-grant college specialists, and representatives of the State Department of Agriculture.

# SAFE STORAGE

Was there ever a bottle or can a child couldn't open?

Because children are children, the only safe place to store pesticides (and medicine and household chemicals) is in a locked cabinet. Keep ALL chemicals, drugs, pesticides out of reach of your children and pets!

Temptation for a child is a soft drink bottle. It's tragic to hear of a child who drank what he thought was a soft drink, only to be poisoned by a chemical stored in this handy container.

NEVER STORE PESTICIDES IN ANYTHING BUT THE ORIGINAL CONTAINER!

# SAFE DISPOSAL

INSECTICIDE

So you had a pest problem, you consulted an expert, he recommended a chemical, you applied it, it did the job. Now you have an empty pesticide container. How do you get rid of it?

Can you wash it and use it for storing other materials? NO! Can you throw it on the empty lot next door? NO!

Put it in the trash pickup if you live in the city or town. In the country, crush metal containers, or break glass ones, and bury them 18 inches deep. Don't try to crush empty aerosol cans--bury them. Burn that paper bag or carton, but stay out of the smoke!!

# GOVERNMENT PROTECTION

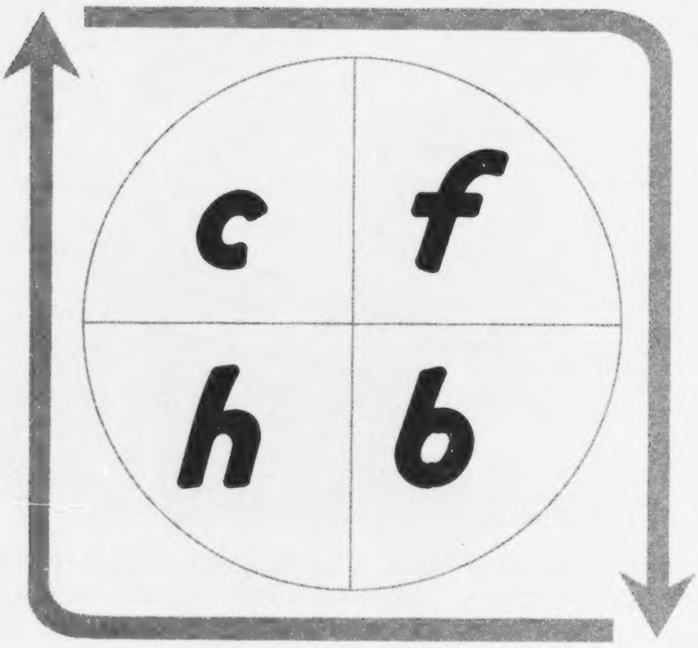
'Heroine' of FDA Keeps Bad Drug Off Market
FDA Chief Warns of Phony Fads
FDA Director Finds Job 'Good Medicine'
Ranchers Join Age-Old Enemy Modern Control Methods
Maximum Acceptable Daily Intakes of Pesticide Residues
FDA says it can control abuse of LSD, but legislators see need for stronger laws
Food Additive Curbs Due
FDA Chief Addresses Democratic Women

Uncle Sam has more than a passing interest in the health of his nieces and nephews. After all, it's mightly hard to collect income taxes from folks who are six feet under--and they don't vote, either!

All pesticides must be registered by the U. S. Government before they can be sold. The Department of Agriculture must be shown that the pesticide is both effective and safe if used according to directions. The law governing the registration and sale of pesticides is the Insecticide, Fungicide, and Rodenticide Act.

The Government also says that only a safe amount of pesticide may remain on or in foods. These amounts are called residues. The Food and Drug Administration limits the amount of residues, and calls these limits tolerances. The law which deals with tolerances is the Food, Drug, and Cosmetic Act; the Food and Drug Administration has the job of enforcement.

Regulations and rules pertaining to pesticides are constantly reviewed and up-dated in an effort to give you the utmost protection.



"Pesticides are a great boon to mankind. We use them in and around our homes; they are used on farms; and they are used in many public health programs to prevent the spread of disease. You can yourself use pesticides with complete safety--if you follow the directions that come with them."

. . . . Dr. David E. Price, Assistant Surgeon General, U. S. Public Health Service.

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